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Poverty Correlates and Indicator-Based Targeting in Eastern Europe and the Former Soviet Union

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Jeanine Braithwaite

Social protection systems in the transition economies have been inadequate to meet the challenges of transition, being both costly and poorly targeted. The largest group of poor people is the working poor — especially workers with little education (primary education or less) or outdated vocational or technical education.

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Summary findings

Grootaert and Braithwaite compare poverty in three Eastern European countries (Bulgaria, Hungary, and Poland) with poverty in three countries of the former Soviet Union (Estonia, Kyrgyz Republic, and Russia). They find striking differences between the post-Soviet and Eastern European experiences with poverty and targeting. Among patterns detected:

- Poverty in Eastern Europe is significantly lower than in former Soviet Union countries.
- Rural poverty is greater than urban poverty.
- In Eastern Europe there is a strong correlation between poverty incidence and the number of children in a household; in the former Soviet Union countries this is less pronounced, except in Russia.
- There is a gender and age dimension to poverty in some countries. In single-person households, especially of elderly women, the poverty rate is very high (except in Poland) and poverty is more severe. The same is true in pensioner households (except in Poland). In Poland the pension system has adequate reach.
- Poverty rates are highest among people who have lost their connection with the labor market and live on social transfers (other than pensions) or other nonearned income. But through sheer mass, the largest group of poor people is the working poor — especially workers with little education (primary education or less) or outdated vocational or technical education. Only those with special skills or university education escape poverty in great numbers, thanks to the demand for their skills from the newly emerging private sector.
- The poverty gap is remarkably uniform in Eastern European countries, especially Hungary and Poland, suggesting that social safety nets have prevented the emergence of deep pockets of poverty. This is much less true in the former Soviet Union, where those with the highest poverty rate also have the largest poverty gap.

In the short to medium term, creating employment in the informal sector will generate a larger payoff than creating jobs in the formal (still to be privatized) sector, so programs to help (prospective) entrepreneurs should take center stage in poverty alleviation programs.

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1. Introduction

This paper undertakes a comparative analysis of poverty in three East European countries (Bulgaria, Hungary, Poland,) and three countries of the Former Soviet Union (FSU) (Estonia, Kyrgyz Republic, Russia). To that effect, we constructed a comparative data set, whereby household survey data from the six countries were carefully checked, cleaned and made comparable. The resulting data set has been dubbed HEIDE (Household Expenditure and Income Data for Transitional Economies) and its content and construction method are described in detail in Ackland et al (1997).

Although our analysis of the HEIDE data found elements in common, the most striking result is how different the post-Soviet experience with poverty and targeting is from the East European one. Overcoming the Soviet legacy has not been as easy as the generally positive East European prototypes would have suggested. Poverty correlates for the FSU are not as sharp nor as well-defined as in Eastern Europe, yet poverty levels are also higher in the FSU, presenting a larger challenge to governments as they try to reduce poverty and improve targeting.

We have set ourselves three tasks in this paper. First, we construct a profile of the incidence and depth of poverty in the six countries, using aggregate poverty indexes. The aim is to find out what the common elements are in the profile of poverty in Eastern Europe and the FSU, and which aspects of poverty are country-specific or bi-modal (e.g. the immediate Soviet legacy of the FSU vs. the more diluted Soviet legacy of Eastern

Europe). If we find a large common element, it opens up the possibility of a region-wide policy approach to poverty alleviation.

Second, we undertake a multivariate analysis of the determinants of poverty. This overcomes the limitations of the one- or two-dimensional approach typically embodied in a tabular presentation of a poverty profile. The econometric modeling work addresses separately the incidence of poverty and the depth of poverty, using reduced-form equations. Our objective is to find important correlates of poverty, and, where possible, attribute causality to them. The results will also clarify whether the determinants of welfare, such as the demographic characteristics of households and the returns to household assets, differ between the poor and the non-poor.

Our third and most important task, is to derive a policy approach towards poverty alleviation. Specifically, we wish to evaluate the role which means testing and indicator-based targeting can play in channeling social transfers to the poor. In part because of the socialist legacy, social transfers constitute a huge component of public expenditure in Eastern Europe and the FSU, representing as much as one-fifth of gross domestic product (GDP). The need to reduce these expenditures is pressing and the need for suitable targeting devices is high. We will demonstrate the contribution which indicator-based targeting can play.

Each of these three tasks is given a section in this paper (respectively, sections 3, 4, and 5). Before presenting empirical results though, we address in the next section the relevant methodological issues.

2. Methodological Issues in the Modeling of Poverty

In line with most recent work on poverty, the analysis in this paper is based on a money-metric measure of utility and welfare. Total household expenditure is used as measure of household welfare and as a basis to rank households and to define a poverty line. Expenditure is preferred to income because it is usually better reported in household budget surveys.[1] Furthermore, there is the important theoretical consideration that expenditure reflects better permanent income. This argument is particularly relevant in transition economies where the volatility of current income is still quite high, due to the lack of steady private sector employment and the resulting high rates of unemployment. Arrears on the payment of wages and pensions, especially in FSU countries, further adds to the unreliability of current income as a measure of welfare.

The analysis below takes into account differences in needs due to different household size and composition and therefore uses household expenditure per equivalent adult as the welfare measure. There is a wide choice of adult equivalency scales, and different scales are used in different countries. Our comparative analysis objectives require the use of a single scale, and we have opted for the OECD scale, because of its simplicity of use and wide familiarity. This scale is expressed as follows

[1] This is only recently the case in East European countries. Prior to transition, income was usually better reported, because most income sources were under the direct control of the state, and data collection agencies could verify reported income at the source. This is why most pre-transition analysis of poverty has used income-based measures. After transition, the emergence of private sector income (especially self-employment income) has led to a decline in reliability of reported income data, in line with the experience of western countries (see, for example, Revesz, 1994 for the case of Hungarian income and expenditure data).

$$EXP_{EQ} = \frac{EXP}{n^{(0.7)}}$$

where EXP is total household expenditure and n is household size.[2] The OECD scale reflects economies of scale due to household size but does not incorporate gender differences.

Household expenditures were not deflated by a regional price index to take potential differences in prices within the country into account. The reason is that, except for Russia, the countries in the analysis are all fairly small and regional price differences can be expected to be minor. For example, for Poland (the second largest country in the set), regional price differences were found not to exceed 2 percent (Grootaert, 1995). For Russia, informal calculations suggested that the effect on poverty estimates of correcting for regional price differences was very small. During the period of analysis, several countries experienced significant inflation and in these cases expenditures were deflated with a month-by-month consumer price index. This yields real household expenditure per equivalent adult as measure of household welfare.

A cut-off point needs to be selected to serve as poverty line across the distribution of real household expenditure per equivalent adult. We rejected the use of an absolute line, such as x dollars in PPP-terms, due to the wide variation in income levels across the six countries. Indeed, it is not very meaningful to compare poverty profiles, when for one country the profile pertains to less than 5 percent of the population and for another

[2] For the household sizes typically found in Eastern Europe and the FSU, this formulation is a close equivalent of the more conventional statement of the OECD scale whereby the first adult = 1, other adults = 0.7, and children = 0.5. The exponential formulation however simplifies the calculations.

country to almost half the population. Hence, we opted for a relative poverty line, which after some experimentation, was set at two thirds of mean household expenditure per *equivalent adult*.[3]

Obviously, the exact position of the poverty line selected affects the results. Individual country studies have shown that in certain ranges of the distribution, even fairly small movements of the poverty line can have large effects on the estimated incidence of poverty (see e.g. Grootaert, 1995 for Poland; Grootaert, 1997a for Hungary; World Bank, 1995b for Russia). However, poverty profiles tend to be more robust than incidence figures, and significant modifications do not tend to occur unless the poverty line is set in the very lowest ranges of the distribution, especially in the lowest decile. Nevertheless, a sensitivity analysis would be useful, and the earlier cited country studies contain analyses with different poverty lines. The sheer bulk of tabular and regression results for a six-country study make it impractical however to include a formal sensitivity analysis in this paper. We refer the interested reader to the country studies.

Our selection of aggregate poverty index is the popular P-alpha class of poverty measures introduced by Foster, Greer and Thorbecke (1984). This index is defined as

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right)^\alpha$$

[3] It is generally agreed that poverty measures should be calculated over individuals. Hence the relative poverty line was defined over an individual distribution, under the assumption that each individual in the household has the same welfare, equal to total household expenditure per equivalent adult.

where n = number of people
q = number of poor people
z = poverty line
y_i = expenditure of individual *i*
α = poverty aversion parameter

The poverty aversion parameter can take any positive value or zero. The higher the value the more the index "weighs" the situation of the very poor, i.e., the people farthest below the poverty line. Of specific interest are the cases where α = o and α = 1.

If α = o, the index becomes

$$P_o = \frac{q}{n}$$

which is the simple head count ratio of poverty, i.e. the number of poor people as a percentage of the total population. While this is a useful first indicator, it fails to pay attention to the depth of poverty. To do so, one also needs to look at the extent to which the expenditures of poor people fall below the poverty line. This is customarily expressed as the "income gap ratio" or "expenditure gap ratio" which expresses the average shortfall as a fraction of the poverty line itself, i.e.,

$$\frac{z - \overline{y_i}}{z}$$

where $\overline{y_i}$ is the average income or expenditure of the poor.

A useful index is obtained when the head count ratio of poverty is multiplied with the income or expenditure gap ratio. This corresponds to

$$P_1 = \frac{q}{n}\left(\frac{z - \overline{y_i}}{z}\right)$$

which reflects both the incidence and depth of poverty. This measure has a particularly useful interpretation because it indicates what fraction of the poverty line would have to be contributed by every individual to eradicate poverty through transfers, under the assumption of perfect targeting. This can be considered as the minimum amount of resources needed to eradicate poverty, given that perfect targeting is not likely to be achieved in practice.

In the tables below we show the head-count ratio P_0, and the ratio P_1/P_0, i.e. the expenditure gap ratio.[4] We prefer to call the latter "poverty gap" (PG) to highlight that it is a measure of the average depth of poverty calculated over the poor only. In contrast, P_0 and P_1 are ratios which are calculated over the entire population (for a further discussion of these measures, see Ravallion, 1993). In the tables below each of these measures has been multiplied by 100 for easier interpretation.

The comparative poverty profile in the next section of this paper is based on one- or two-dimensional disaggregations of the P-alpha index. While this yields a useful

[4] In making this selection, we trade-off "ideal-ness" of the poverty measures for the sake of familiarity and ease of interpretation. An ideal poverty measure must meet the monotonicity axiom (all other things equal, a reduction in the income of a poor person must increase the poverty measure) and the transfer axiom (all other things equal, a net transfer of income from a poorer to a richer person must increase the poverty measure). Neither P_0 nor P_1/P_0 meet these axioms, but their product, P_1, meets the monotonicity axiom. In general, the P-alpha class of measures meets the monotonicity axiom for $\alpha > 0$, and the transfer axiom for $\alpha > 1$ (Foster, Greer and Thorbecke, 1984).

identification of important correlates of poverty, it cannot establish the relative importance of each correlate (or determinant, if causality can be assumed). A multivariate model of poverty is hence indicated. A basic model uses real household expenditure per equivalent adult as dependent variable in a regression with exogenous household endowments and characteristics as explanatory variables. Such welfare model is a reduced-form equation of the various structural equations which express the income-earning and consumption behavior of the household (see e.g. Glewwe, 1991). This model can explicitly recognize the economic characteristics of the environment in which households operate. Consider the following model:

$$E_i = \beta_1 X_i + \beta_2 W_i + \varepsilon_i \qquad (1)$$

where E_i = real household expenditure per equivalent adult of household i
X_i = a set of characteristics of households i
W_i = a set of characteristics of the economic environment of household i
$\beta_{1,2}$ = model parameters
ε_i = error term

While such model is not able to predict the effect of household characteristics on specific income or consumption decisions (this would require structural equations), it allows to observe the net effect of any given characteristic, holding all others constant, on resulting household welfare. It is assumed at this point that there is no simultaneous effect of household welfare on household characteristics so that no X_i are endogenous. This assumption is time-dependent, i.e., we assume this to be the case within some relevant time period. (We revisit this issue below when discussing the specific variables to be

included in the model). With this assumption, simple OLS estimation of equation (1) is appropriate.

From the point of view of understanding poverty, equation (1) is not necessarily optimal. It imposes constant parameters over the entire distribution. It thus assumes that the effect of a given household characteristic, e.g. education, is the same across the entire welfare spectrum, and that the underlying structural equations do not differ for poor and non-poor. One could say that in this representation the poor are viewed merely as "rich people with less money." This is arguably an incomplete representation. While one should of course not see the poverty line as a barrier which divides the population into two entirely different groups, it is certainly arguable that poor people face different (often more severe) constraints, e.g. to obtain credit, to obtain labor market information, to set up enterprises, etc. On the other hand, they may well be more adept at obtaining transfer income. This calls for additional modeling of poverty.

There are several ways of addressing a situation whereby parameters can be expected to differ across different segments of the distribution. One can estimate the welfare regression separately for poor and non-poor, or introduce a set of interaction variables (between a binary variable for poor/non-poor and the other right-hand side (RHS) variables). Both methods are equivalent econometrically, but their estimation is problematic. In the first method, each group (the poor and the non-poor) forms a truncated section of the overall distribution, so that OLS estimation would lead to biased estimates. The second method leads to the same result, because the binary interaction variable is clearly endogenous—it is merely a binary representation of the dependent

variable. This endogeneity problem also rules out the use of a Heckman-type selection model to, first, determine poverty status and, then, using the derived inverse Mills-ratio to correct the welfare equations of the poor and non-poor groups. In practice, since the poverty criterion is the same as the dependent variable in the welfare equations, it would be very difficult to place an identifying restriction on the welfare equation.

A workable solution is at hand, however, if the situation can be seen as a censored model, in which case Tobit estimation becomes possible. This requires the assumption that equation (1) is the correct welfare model for the poor and that the same set of explanatory variables determine whether one is poor or not. No assumptions are made about the determinants of welfare of the non-poor (the process and the parameters could or could not be the same). The model sets any expenditure level higher than the poverty line equal to the poverty line, i.e. the data are censored at the poverty line.

$$E_i' = E_i \quad \text{if} \quad E_i < z \qquad (2)$$
$$E_i' = z \quad \text{otherwise}$$

where z = poverty line, and E_i is determined as in equation (1)

This model allows for the possibility of different parameters for the poor and non-poor and can be estimated consistently if the error terms is assumed to be normally distributed (Maddala, 1983). Furthermore, a comparison of the estimated parameters of (2) with those of (1) provides a test of whether the parameters of equation (1) do indeed differ between the poor and the non-poor. This is especially relevant for the parameters of asset variables, which measure the returns to these assets, and one can hence test whether,

for example, the returns to education differ between the poor and the non-poor (Appleton, 1995).

Conceptually, this model specification corresponds to modeling the poverty gap, i.e. the poor's expenditure shortfall expressed as a ratio of the poverty line, i.e.

$$\frac{z - E_i}{z} \qquad \text{for} \qquad E_i \leq z$$

Whereas this ratio is constrained between 0 and 1, the poverty gap itself is constrained between 0 and z. In practice, it ranges between zero and z minus the lowest E_i in the sample, which is what equation (2) depicts.

When estimating poverty models on the basis of household survey data, it needs to be recognized that such data are likely to contain a certain amount of measurement error. If the error is limited to the dependent variable, it does not bias the estimated coefficients (so long as the error is not correlated with any of the RHS variables), but it will affect the variance-covariance matrix. A potential concern though is that the measurement error of household expenditure may rise systematically with the level of expenditure. This increases the probability of correlation with RHS variables such as education, which is positively correlated with the level of expenditure. This could lead to biases in the estimation of equations (1) and (2).

The presence of measurement error has led several authors to substitute limited-dependent variable models for the continuous welfare equation. Gaiha (1988) used a binary logit model to predict the probability that a rural household in India would be

poor.[5] Diamond et al (1990) estimate a multinomial logit model on U.S. data to predict the probability of belonging to an income quintile, conditional upon certain personal and household characteristics. Diamond et al justify their approach, relative to a continuous welfare regression, by arguing that the restrictions imposed by the functional form of a levels regression (often linear or log-linear) may cause it to fit poorly on the actual distribution, and demonstrate that this is the case for their U.S. data set. The multinomial logit model allows for discontinuities in the underlying welfare model and thus also solves the concern of imposing equal parameters over the entire distribution discussed earlier. In the case of two groups (poor and non-poor) the approach collapses to a binary logit or probit model, although then the underlying welfare model is again continuous (Ravallion, 1996). There has been a recent debate in the literature on the merits of welfare regressions versus binary poverty models. Ravallion (1996) argues that the binary response model is redundant, since the parameters measuring the effect of household characteristics on the probability to be poor can be derived from the levels regression, which is consistently estimable under weaker assumptions about the distribution of the error. As argued in Grootaert (1997b), this argument applies if there is only random measurement error and if a case can be made for imposing constant parameters over the entire distribution.

As we discussed earlier, the latter issue has been dealt with in this analysis through Tobit estimation of the expenditure of the "poor" segment of the distribution. The possibility of systematic measurement error has led us to undertake also probit estimation

[5] To our knowledge, the first use of such model in the empirical poverty literature is by Bardhan (1984) in a study of poverty in rural West Bengal.

of a poverty equation where the dependent variable is binary (poor/non-poor). Explanatory variables are the same as in the welfare regression. It is clearly a judgment call whether the loss of information embodied in the binary regression (collapsing the entire distribution into two values) outweighs the risk of bias due to measurement error. However, to the extent that results from a binary model confirm levels-regression results, they can act as a robustness test for the latter. In recent years, use of probit and logit models (mainly the former) have become common practice in poverty analysis (see e.g. Alderman and Garcia, 1993; Lanjouw and Stern, 1991; World Bank, 1995d, 1996d; Appleton, 1996; Grootaert, 1997b).

In summary, the determinants of poverty will be estimated in this paper on the basis of three models:

(i) OLS regression of welfare equation (1);

To account for differences in parameters between the poor and nonpoor, (the poor are <u>not</u> rich with less money) without losing information from level-regressions:

(ii) Tobit estimation of the welfare level of the poor, based on equation (2); this is equivalent to modeling the poverty gap;

To solve the problem of non-random measurement error (especially mismeasurement as a function of level of expenditure):

(iii) Probit estimation of a binary poverty equation.

Each of these three models has the same RHS and we turn now to the discussion of which variables can be considered exogenous household characteristics. As we pointed out earlier, this is mainly a function of the time horizon considered relevant. It has become fashionable in econometrics to take a rather narrow view on this (i.e., to consider a long time horizon) and to estimate welfare models with very parsimonious RHS (see e.g. Glewwe and Hall, 1995). As Appleton (1995) has argued, reasons can be found why almost every conceivable determinant of poverty is simultaneously determined with welfare, and he cites a number of examples of such discussions in the literature. In the end, little more than gender, age and a few parental characteristics end up as truly exogenous.[6] Such econometric purity is problematic if the analysis is meant to guide policy. Most policy and targeting variables at the household level become endogenous if the time period is made long enough. All assets (education, physical capital, land) as well as household size are to some degree a function of the household's welfare level and its evolution over the life cycle. Location can change due to migration. Likewise, the household head can change as a result of migration, or the splitting of one household into several households (or the reverse process).

While we recognize the strict validity of these arguments, for this exercise we have taken a pragmatic view, and used a fairly generous set of RHS variables. The objective is to identify determinants of welfare and poverty which, in the short run, are valid policy and targeting variables. As relevant time frame, we consider the reference period for the data collection, i.e. a year or less. We include therefore on the RHS variables which the typical household in the six transition economies in question cannot change in a one-year

[6] In an inter-generational context, even parental characteristics can be endogenous.

period or only with great difficulty or cost. This takes the specific situation of these economies into account, and explains e.g. why some labor market variables are included on the RHS. In a fully functioning market economy, occupation and labor market status must be viewed as endogenous, but this is not the case in many transition economies. Unemployment is high and largely structural, retraining opportunities are limited, and in some countries, the supply of housing is not yet sufficiently flexible to permit easy migration to areas of growing labor demand.

On the other hand, among the asset variables, we have not included ownership of durable goods on the RHS for estimating the three models listed above. This is actually more of a judgment call than it may appear. Until a few years ago, in the countries in our analysis, such goods were rationed. With the possible exceptions of Hungary and Estonia, there is not yet a fully operating market for these goods, accessible to the entire population. Markets for durable goods such as personal computers, VCRs, etc. often exist only in cities, and due to very high relative prices (compared e.g. to Western Europe) accumulation and decumulation of such goods is rare for all but the very rich. For many households, the existing stock is still largely determined by the pre-transition allocation. Nevertheless this situation is rapidly changing.

Generally speaking, asset variables have to be seen as endogenous with respect to household welfare, because in an inter-temporal context, the household's welfare level will determine the extent of education children receive and will determine capital accumulation. For one-period model estimation, based on cross-sectional household data, the case for exogeneity is stronger, but not absolute. In principle, it would be desirable to

replace these variables with instruments such as parents' education, inherited wealth, etc. Unfortunately, such variables are not available in the data sets and our regressions include productive asset variables on the RHS. In interpreting the regression results, some caution will thus be necessary, not to view the estimated coefficients as measuring strictly one-way causality from assets to welfare or poverty.

Using a one-year time frame, we consider as exogenous the following sets of variables:

- household assets: education, physical capital (house, household enterprises), land;
- demographic household characteristics: household size and composition and characteristics of the head of household;
- labor market connections: unemployment, and share of wages in total income;
- economic environment: location.

The *human capital* of the household is embodied in its members and hence their numbers (by sex and age group) are introduced as regressors. Since it is likely that the education of the head of household has a greater influence on welfare and poverty outcomes than that of other members, the education level of the head was introduced as a separate regressor, by means of a series of dummy variables reflecting the highest level of education achieved (primary or less, secondary, vocational/technical, university). The earlier cited country poverty studies have indeed found strong bivariate correlations between poverty incidence and the level of education of the head of household. The data at hand do not provide information on work experience, but this can be proxied by age.

The age of the household head is also a good indicator of the stage in the life cycle of the household.

Information on *physical capital* is somewhat scant in the data sets. We know whether the household owns a farm or small business but have no information on the value of its assets. Nevertheless, information on ownership (or use, in countries where legal ownership is still unclear) is bound to be very important, because the emergence of small private enterprises is a key feature of transition, and poverty among such entrepreneurs is likely to be below average.

Ownership of a house is important in the same sense. In many cases it provides the location for a household enterprise, and for many households it constitutes the main asset against which it can borrow and from which it derives rental income (actual or imputed).[7] In most transition economies, the supply of housing is still quite rigid, and a housing market is absent in many locations. Housing ownership is still frequently the result of pre-transition allocations by the state. hence, there is a strong case for considering home ownership as exogenous to the process of determining welfare. Similarly, ownership of land is in most transition settings not yet a full household choice variable, and, especially in rural areas, it is a key determinant of cash income and consumption of food.

[7] Ackland et al (1997) discuss in detail the procedures used for the computation of the value of housing services.

The *link with the labor market* is captured in the model with two variables: the share of wages in total household income, and the number of unemployed household members (in some cases this was replaced by the employment status of the head of household, if this variable yielded a better specification). The case for exogeneity of these variables rests on the fact that in the transition context, many of the labor market status outcomes are determined, or at least greatly influenced, by the labor market status that obtained prior to transition and/or by the macro-economic changes. Of course, it must be recognized that personal characteristics do contribute to unemployment, or make it more or less likely than a person will successfully obtain self-employment income. Again, instrumental variables would provide a solution if they were available. (E.g. one possibility would be to use regional rather than household-specific labor market variables). We kept these variables in the equation mainly because of their importance for targeting, but again recognize the need for caution in interpreting the coefficients.

The way in which the household utilizes its asset endowment is a function of various *demographic household characteristics*. The demographic structure of the household has been shown to have a strong relation with poverty incidence. Beyond the number of children and adults, it is useful to specify the age and sex of the household head because those factors may be related to the household's ability to cope with a changing economic environment.

Lastly, the incidence of poverty is affected by *the economic environment* in which the household operates. This relates especially to income earning opportunities and the level of social and economic infrastructure. In a transition context, the household's ability

to adjust to a new economic reality will depend very much upon whether it lives in an urban or rural area, in a large or small city, in an old industrial region, etc. In this research, we will capture this by categorical variables for type of locality (capital or other city, village).

Annex 1 shows the means and standard deviations for the full set of variables used in estimating the welfare and poverty equations.

Apart from laying out the set of determinants of welfare and poverty (the objective of Section 4), these equations can also be used to investigate how feasible means-testing and indicator-based targeting is. Almost all East European and FSU countries rely on these techniques to allocate social assistance and sometimes other transfers as well. If an effective, reliable and low-cost test for income were available, there would of course be no need for indicator-based targeting. In practice, most social assistance authorities find it very difficult to apply means tests and find that applicants on average underreport income, especially self-employment income. We wanted to test how many poor people could be correctly identified based on a simplified means test and relying on easily identifiable indicators. To that effect we re-estimated equation (1) with an expanded set of variables, adding wage-income and public-transfer income (the two "official" and most easily verifiable income components for most households), and also a list of durable goods owned by the household.

As we discussed earlier, these variables are likely to be endogenous to the level of welfare, but our objective here is simply to predict outcomes. Hence, we do not interpret the estimated coefficients of e.g. TV ownership as the "contribution" of this variable to

welfare, but merely as a partial correlation coefficient incorporating all feedback effects from welfare to durable ownership. We estimated the expanded equation (1) with forward step-wise OLS, so as to identify the strongest correlates and best predictors first.[8] as to identify the strongest correlates and best predictors first. The results of this exercise are discussed in Section 5.

3. Poverty Profiles

The changing nature of poverty in Eastern Europe and the Former Soviet Union has paralleled the sharp changes in economic management and in government in the region over the past two decades. Even before the collapse of the Berlin Wall and the break-up of the Soviet Union, East European countries had been experimenting with economic reforms which brought their systems closer to market economies. Two of the early leaders in such reform efforts, Hungary and Poland, are case studies for this analysis. Hungary was arguably the first country in Eastern Europe to embrace economic reforms, with its market-oriented New Economic Mechanism, and Poland's Solidarity movement was an early large-scale populist movement towards more democratic government and a freer economic environment.

Along with economic reform in Eastern Europe quickly came the labor market consequences of shutting down non-profitable state enterprises. Unlike in the FSU, where adjustment was much later and fell almost exclusively on real wages, in Eastern Europe,

[8] It would also be possible to use a step-wise poverty probit equation for this objective. However, most social assistance authorities are interested not just in classifying applicants as poor/non-poor but also in determining the extent of the welfare shortfall. Hence, the OLS welfare equation is a more useful basis for a predictive model.

open unemployment along with real wage declines was characteristic of phase changes in government and the economy. One paradoxical result of this is that poverty is much more clearly defined in Eastern Europe than in the FSU, and the poverty profiles of East European countries identify poverty correlates more clearly. This makes improvements in targeting in Eastern Europe much more realistic to posit than in the FSU, where the poor are not so well-differentiated from the not-so-poor.

Although this conclusion might seem somewhat surprising, it is not especially new. Even with far more inferior databases, Atkinson and Micklewright (1992) concluded that poverty in Eastern Europe was more defined and less all-encompassing than poverty in the Former Soviet Union. However, during the reference period for their work (1991 and earlier) the FSU had not broken up; nor had there been the sharp changes in the macroeconomic environment associated with the dissolution of the FSU, so it is not surprising that the earlier time period and the use of official data led Atkinson and Micklewright (1992) to conclude that overall, FSU poverty was not as severe as in many East European countries, but further, that poverty within the FSU was highly heterogeneous (see also Braithwaite, 1991).

With the breakup of the FSU, there were severe disruptions in the old trading and monetary regimes. The demise of the ruble zone, the political ramifications of the declarations of independence, the build-up of arrears in the payment for energy imports, the difficulties in macro management of the newly independent countries, and the difficulties in finding alternative suppliers for intermediate inputs (which in many cases were highly specialized), all combined to result in catastrophic declines in GDP. Whereas

the aggregate decline in GDP for the East European countries was 10 percent during the period 1990-96, it was 45 percent for the FSU. Especially sharp declines were registered in 1993 and 1994, which were run-away hyperinflation years in most FSU countries.

Under these circumstances, it is hardly surprising that open poverty has increased drastically in the FSU. Poverty also increased in Eastern Europe, but Eastern Europe managed to avoid most of the macroeconomic disruption associated with the break-up of the FSU, or if problems such as hyperinflation and collapsing real wages were encountered, they were encountered much earlier than during 1990-96. As a result, poverty in Eastern Europe has become much more like poverty in Western Europe—highly correlated with the situation in the formal labor market and the skills of individuals. As the poverty profiles below indicate, in the FSU, poverty is not well-correlated with the nature of labor market participation of household members, but neither is it well-correlated with the lack of formal labor market ties. Basically, in the FSU, poverty is more pervasive than in Eastern Europe and not as well-defined. It is much more difficult to differentiate a poor FSU household from a non-poor one based on observable correlates.

These qualitative and quantitative differences in the experience of poverty in Eastern Europe and the FSU are demonstrated in by the cross-tabulation of poverty correlates, headcounts, and measures of severity of poverty presented below.

A. Eastern Europe

In Eastern Europe, the start of rapid transition in the early 1990s accelerated the existing trend towards increasing poverty[9]. The main contributing factors were the loss of employment in a suddenly contracting state-sector, without coincident emergence of private sector employment. Rapidly rising unemployment has in fact been one of the most visible signs of the social costs of transition. A number of East European countries also experienced significant inflation (although it did not reach the level of the hyper-inflation experienced by some FSU countries). Adjustments in wages, pensions and other social transfers lagged behind, and real incomes for many people fell. However, the emerging evidence suggests that these effects have been fairly short-lived. The three East European countries in this study experienced less GDP declines than the three FSU countries, and in the 1994-1995 period, they have each returned to positive growth.

The figures in Table 1 indicate that poverty rates as well as poverty gaps are lower in the East European countries than in the FSU countries. As a reminder, poverty rates measure the incidence of poverty as the percentage of population below the poverty line (two-thirds of mean household expenditure per equivalent adult). The poverty gap measures the depth of poverty as the poor's average shortfall in expenditures from the poverty line expressed as a percentage of the poverty line. (Both measures were discussed in detail in Section 2). FSU poverty rates exceed 30 percent and poverty gaps exceed 20 percent. Russia has the worst situation with a poverty incidence of almost 40 percent and an average poverty gap of 30 percent. While the poverty rate of Kyrgyz Republic is

[9] See Milanovic (1990) for an analysis of pre-transition trends in poverty.

higher (42.5 percent), its poverty gap is lower (25 percent) than Russia's. Hungary and Poland show the most favorable situation with respective poverty rates of 21 percent and 23 percent. The poverty gap is slightly higher in Hungary (14.1 percent) than in Poland (13.3 percent). It thus appears that poverty in Eastern Europe is much more shallow than in FSU, which is good news from the point of view of poverty alleviation in Eastern Europe. It suggests that as economic growth resumes, rising incomes may rapidly lift many people above the poverty line.

Table 1: Poverty and Locality

Locality	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
			Headcount (P_0, in percent)			
Capital	17.5	20.3	10.1	20.6	22.9	18.2
Other Cities	20.5	17.7	16.9	31.6	38.0	38.4
Urban Subtotal	19.9	18.5	16.2	27.5	33.3	35.8
Rural	39.2	24.0	33.8	38.7	47.2	49.6
Total	26.1	20.6	23.0	30.5	42.5	39.4
			Poverty Gap (in percent) 1/			
Capital	19.9	13.9	13.4	19.7	24.0	20.7
Other Cities	17.8	13.5	12.7	19.2	26.2	28.7
Urban Subtotal	18.1	13.6	12.7	19.4	25.7	28.1
Rural	21.7	14.6	13.8	21.9	24.7	33.2
Total	19.8	14.1	13.3	20.2	25.0	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).
Notes:
1/ The poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

Location

The strong causal role played by changes in employment in creating poverty during transition in Eastern Europe make it likely that transition economies will show strong geographic patterns of poverty and that urban and rural areas will be affected differentially.

This is confirmed by Table 1 which shows that in all three East European countries rural poverty is higher than urban poverty. In Bulgaria and Poland, rates of rural poverty incidence are almost twice the urban rates. In Hungary, the urban-rural difference is small. Within urban areas, the differences between the capital and other cities are not so pronounced. (This is a marked difference with the situation in the FSU in which capital cities are markedly less poor than other cities). In Bulgaria and Poland, poverty rates are slightly lower in the capital than in other cities, but in Hungary the reverse is true.

The depth of poverty varies less than the incidence of poverty in Eastern Europe. In general, poverty is slightly deeper in rural areas than in urban areas, but within the latter poverty is deepest in the capital cities. So, while East European capitals have generally less poverty than elsewhere, the poor in those capital cities do have a greater shortfall in expenditure than elsewhere. This situation is distinct from the FSU, where both poverty incidence and poverty gap are lowest in the capital cities.

Family Composition

Almost all empirical work on poverty in Eastern Europe and the FSU has identified a strong correlation between household size and composition and poverty incidence. In Eastern Europe, the correlation is strongest with number of children. In each of the three countries analyzed here, households with three or more children have poverty incidence about double the national rate (Table 2). It does not matter much whether this is a nuclear household or an extended household with more than two adults. The exception is Hungary where the poverty rate in extended households with three or more children is more than triple the national rate. This is because in Hungary extended households often arise as a result of poverty, which forces separate households to merge in order to benefit from economies of scale in housing and other expenditures.

The implication is that in Eastern Europe, poverty among children is higher than average and the presence of children needs to be considered as a strong candidate indicator for targeting. We will revisit this proposition in the following sections when reviewing the multivariate results. The finding of a strong correlation between poverty and the presence of children also constitutes a call to reform entitlement programs such as family allowances which provides fixed amounts of money to households with children. These allowances are probably not needed by the richer households, and they are clearly insufficient to prevent households with many children from falling into poverty. A possible solution is to introduce means-testing and to increase the amounts given to large

Table 2: Poverty and Family Composition

Family Composition	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
			Headcount (P0, in percent)			
One Male Adult, No Children	33.1	24.2	15.6	32.5	40.0	52.5
One Female Adult, No Children	45.0	27.8	13.5	37.0	51.8	47.8
One Adult, One or More Children	23.4	32.1	28.2	43.5	39.7	45.0
Two Adults, No Children	27.4	17.9	12.2	28.2	40.1	37.4
Two Adults, One Child	15.2	20.1	16.1	30.5	42.4	37.0
Two Adults, Two Children	19.4	19.9	24.7	29.6	39.9	38.7
Two Adults, Three or More Children	61.3	38.1	43.3	28.5	49.1	64.2
Three or More Adults, No Children	22.7	13.9	16.6	24.4	37.0	30.2
Three or More Adults, One Child	20.1	17.7	20.2	27.8	35.6	35.8
Three or More Adults, Two Children	35.8	29.5	36.2	31.6	43.3	51.6
Three or More Adults, Three or More Children	55.9	71.1	46.2	57.6	43.6	60.4
All	26.1	20.6	23.0	30.5	42.5	39.4
			Poverty Gap (in percent) 1/			
One Male Adult, No Children	26.0	17.9	22.4	34.3	39.5	42.0
One Female Adult, No Children	28.9	18.6	17.3	27.5	47.4	44.2
One Adult, One or More Children	25.0	20.8	19.7	24.3	26.8	35.9
Two Adults, No Children	20.8	13.8	14.5	20.3	31.8	33.5
Two Adults, One Child	14.3	15.1	13.6	18.8	27.7	26.9
Two Adults, Two Children	18.1	13.1	12.8	17.4	26.7	27.0
Two Adults, Three or More Children	22.0	13.5	13.6	16.8	27.0	28.3
Three or More Adults, No Children	16.2	12.6	13.2	17.3	26.2	27.6
Three or More Adults, One Child	18.6	12.7	12.5	16.2	21.8	26.1
Three or More Adults, Two Children	19.3	12.8	12.8	16.6	23.0	25.0
Three or More Adults, Three or More Children	24.5	13.8	11.7	17.1	22.8	26.6
All	19.8	14.1	13.3	20.2	25.0	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).

Notes:

1/ The poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

poor households. Grootaert (1995, 1997a) contains simulation exercises which demonstrate, in the cases of Poland and Hungary, that this can be achieved in a budget-neutral fashion, and that it has the potential of significantly reducing poverty among children. In part, the potential success from introducing means-testing results from the fact that the poverty gap is not higher among households with many children. This means that on a per capita basis, the resources needed to lift these households out of poverty is not greater than for other kinds of households. In fact, the uniformity of the poverty gap across different types of households, displayed in Table 2, is quite a remarkable feature of poverty in Eastern Europe.

Apart from large households, poverty incidence is also above average in households with one adult. The situation is especially bad in Bulgaria among women living alone, where poverty incidence is 45%. Most of these are pensioners. In Poland, in contrast, households consisting of one man or one woman have below average poverty rates, reflecting that pensions in Poland are higher than elsewhere. In Hungary and Poland, one-adult households with children have higher poverty rates than those without children, and there is some evidence that such households are more likely to fall through the cracks of the family allowance system and to not receive these benefits (Grootaert, 1995, 1997a). Poor one-adult households also experience deeper poverty than other poor households: in all three countries, they have larger poverty gaps than any other type of households.

While Table 2 expresses the composition of the household in terms of the number of adults and the number of children, Table 3 indicates that the number of elderly among

the adults is also correlated with poverty. Except in Poland, households consisting only of elderly have the highest poverty incidence and poverty gap. We return to this later when discussing the age-dimension of poverty.

Table 3: Poverty and Aggregate Family Composition

Family Composition	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
	Headcount (P_0, in percent)					
No Children, No Elderly	18.3	13.0	13.3	23.8	37.6	31.9
Child(ren), No Elderly	25.0	23.9	28.1	32.8	43.1	40.5
No Children, Elder(ly),	39.0	26.1	18.1	39.4	43.8	43.8
Child(ren), Elder(ly)	28.0	22.2	32.7	35.2	42.9	51.5
All	26.1	20.6	23.0	30.5	42.5	39.4
	Poverty Gap (in percent) 1/					
No Children, No Elderly	18.8	13.6	13.6	22.0	29.4	32.2
Child(ren), No Elderly	19.4	14.1	13.2	18.3	24.2	27.1
No Children, Elder(ly)	21.1	15.1	15.5	22.8	34.0	35.5
Child(ren), Elder(ly)	19.5	10.5	11.9	19.2	23.9	27.0
All	19.8	14.1	13.3	20.2	25.0	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).
Notes:
1/ The poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

Labor Force Participation

It is not surprising that labor force status is strongly correlated with poverty outcomes in Eastern Europe. In all countries, wage earners and the self-employed have the lowest poverty incidence and poverty gap (Table 4). Which of these two groups does best depends on the stage of transition. In Hungary, with perhaps the best developed private sector, and the earliest initiation of transition, the self-employed have the lowest poverty incidence—slightly more than half the national rate. Elsewhere though, wage-work still provides the better alternative.

Table 4 also shows though that being a pensioner sharply increases the odds of being poor, except in Poland, and in all countries pensioners have above average poverty gaps. The favorable situation of pensioners in Poland is due to the generosity of the Polish pension system. Of all East European countries, Poland increased spending on pensions the most: between 1988 and 1993, pension spending rose from 6.9 percent to 14.7 percent of GDP (Perraudin and Pujol, 1994). One reason for this was the sudden swelling of the ranks of pensioners by 1.5 million early retirees in the period 1989-1992. Furthermore, in 1992-93, the average pension in Poland was 64 percent of the average wage—the highest ratio in Eastern Europe. Polish pensions were at that time also fully indexed (Milanovic, 1995).[10]

[10] The pension system in Poland is discussed in detail in World Bank (1993) and Perraudin and Pujol (1994). For a more general discussion of pension systems in transition economies, see World Bank (1994).

Table 4: Poverty and Socio-Economic Status

Socio-Economic Group of Household Head	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
			Headcount (P_0, in percent)			
Wage Earner	16.4	15.7	18.7	23.1	38.8	32.5
Self-Employed	24.3	12.7	26.8	26.7	40.3	31.5
Pensioner	44.3	27.4	19.4	47.7	57.0	52.6
Other Transfer Recipient	63.7	57.1	64.1	54.3	61.9	68.7
Other	46.5	49.4	33.5	31.0	42.2	45.2
All	26.1	20.6	23.0	30.5	42.5	39.4
			Poverty Gap (in percent) 1/			
Wage Earner	14.4	12.1	11.7	17.0	23.4	26.9
Self-Employed	15.3	11.1	14.4	24.6	24.8	27.9
Pensioner	23.7	15.9	14.4	23.1	28.6	35.8
Other Transfer Recipient	30.0	21.1	18.6	26.1	26.8	33.1
Other	28.8	16.5	11.5	17.9	25.1	27.8
All	19.8	14.1	13.3	20.2	25.0	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).
Notes:
1/ he poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

While the self-employed are a new socioeconomic category in countries in transition, representing people who have succeeded in adapting economically to transition, there is also another socioeconomic category emerging of people who have fallen victim to transition: those who have severed ties to the labor market, and who are unemployed or irregularly employed, and for whom as a result transfer income (other than pensions) has become the main source of income. This category of people has poverty rates that are around 60 percent, and they also have poverty gaps which are above average. However, except for this category of households, Table 4 again confirms the remarkable evenness of the poverty gap across society. We already pointed at the uniformity of the poverty gap across demographic types of households (Table 2) and the same uniformity is seen across socioeconomic categories.

The specific effect of being unemployed is illustrated in Table 5 which shows the poverty measures by the number of unemployed household members. In Hungary, households without unemployed members have a poverty incidence of 16.9 percent. If one household member is unemployed, the figure jumps to 30.5 percent, and it rises further to 68.7 percent if three or more members are unemployed. In Poland, poverty incidence is 19.7 percent in households without an unemployed member but 50.7 percent in households with two unemployed members. Again though, the poverty gap is not systematically related to the number of unemployed household members, indicating that the social safety net does what it is supposed to do, namely preventing the emergence of pockets of deep poverty. (Of course, this finding does not consider overall cost or efficiency in achieving this result).

Table 5: Poverty and Unemployment

Number of Unemployed Members in the Household	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
			Headcount (P_0, in percent)			
0	...	16.9	19.7	28.4	42.0	37.6
1	...	30.5	35.7	42.6	41.9	53.2
2	...	39.2	50.7	53.1	54.4	73.7
3 or more	...	68.7	46.5	73.2	40.6	66.7
All	26.1	20.6	23.0	30.5	42.5	39.4
			Poverty Gap (in percent) 1/			
0	...	13.1	13.0	19.5	24.4	30.1
1	...	16.0	13.6	22.2	26.5	28.5
2	...	13.6	15.1	27.3	24.4	25.6
3 or more	...	17.9	17.5	30.8	33.9	39.7
All	19.8	14.1	13.3	20.2	25.0	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).
Notes:
1/ The poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

The role of education in this process is made clear in Table 6. There is a distinct difference between the East European and the FSU countries. In Eastern Europe, the link between lower poverty and higher education is extremely pronounced, but in the FSU this link is much weaker, to being almost non-existent in Kyrgyz Republic. In Hungary, e.g., the poverty incidence among households where the head has primary education or less is 33.9 percent, while in households where the head has university education it is 3.3 percent, i.e. ten times less. The equivalent figures for Kyrgyz Republic are 43.2 percent and 37.6 percent. The other countries are somewhere in-between these extremes.

Table 6: Poverty and Education

Education of Household Head	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
			Headcount (P_0, in percent)			
Primary or Less	41.1	33.9	33.0	41.5	43.2	46.2
Secondary	15.6	10.4	13.1	30.0	49.2	40.3
Vocational/Technical 1/	15.0	18.7	26.3	...	41.3	39.5
University or Above	8.9	3.3	3.8	12.7	37.6	25.9
All	26.1	20.6	23.0	30.5	42.5	39.4
			Poverty Gap (in percent) 2/			
Primary or Less	21.6	15.6	14.7	22.7	35.4	35.4
Secondary	16.1	11.8	12.8	19.4	29.6	29.6
Vocational/Technical 1/	12.6	11.9	12.3	...	28.2	28.2
University or Above	14.6	9.8	8.1	14.8	24.0	24.0
All	19.8	14.1	13.3	20.2	29.8	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).
Notes:

1/ For Estonia, secondary education and vocational-technical education are combined and shown in the category labeled "Secondary." Definitional problems in the Estonian dataset precluded a separation of these two kinds of education.

2/ The poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

This difference in the impact of education is clearly related to the stage of transition. The further advanced transition is, the more a private sector emerges which needs well-educated workers, with general education backgrounds which makes them flexible and adaptable to the newly emerging skill requirements. Pre-transition vocational and technical education, often geared towards traditional industrial occupations, is no longer in demand. Similarly, low-skill jobs, of the type held by workers with primary education or less, have disappeared in great numbers. The more advanced transition countries such as Hungary and Poland have already experienced skill-shortages in fields like engineering, computer science and the like, and this will further push up wages received by workers with university education, and increase the wage-gap across skill-levels. This is one of the main reasons why the distribution of wages has increased in many transition economies (Milanovic, 1995, 1997).

Education is also the only dimension where the wage gap is <u>not</u> uniform across categories in Eastern Europe. Workers with primary or less education have not only poverty rates well above average, but the poverty gap is also significantly higher than for other groups. Households where the head has a university education have the lowest poverty gap of any category, along any dimension, displayed in the poverty profile. It may be surprising that the poverty gap varies so much with education level, while it varies very little with the number of unemployed in the household. In part, the reason is that education is not used as a targeting variable for any transfer program (although our results suggest that perhaps it should become a targeting variable for Eastern Europe—see Section 5). Although clearly low education is in itself a contributing factor to

unemployment, many people with low education still hold full-time jobs (let us not forget that they are a very large category: in Poland and Hungary, about two-thirds of households have heads with primary or vocational/technical education). Their wages are low, and as our results indicate, often insufficient to keep them above the poverty line. Still, as full-time workers, they do not qualify for any transfers (other than general entitlements) to supplement their income. There is no immediate solution to this situation. In the medium to long term, retraining and a general upgrading of schooling curricula will reduce the number of people with low education. Also, people with low education are older than average, and many of them will become absorbed in the pension system in the near term. Whether this will alleviate their poverty, depends partly upon policies pertaining to minimum pensions.

Gender and Age

We already noted the correlation between household composition and poverty outcomes, especially the association between the presence of three or more children and high poverty incidence. Since demographic household characteristics are easily observable and potentially useful targeting variables, it is worthwhile to look in more detail at the age and gender dimensions of poverty in Eastern Europe.

Table 7 shows that female-headed households have systematically higher poverty incidence and poverty gaps than male-headed households. The difference is slight in Poland, but more pronounced in Hungary and Bulgaria. The multivariate analysis in the next section will confirm that such a gender-effect remains even after controlling for the

characteristics of female-headed households that are strongly correlated with poverty such as low education.

Table 7: Poverty and Gender of Household Head

Gender of Household Head	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
			Headcount (P_0, in percent)			
Male	24.0	19.1	22.7	27.9	41.6	37.8
Female	40.5	25.6	23.7	39.1	50.5	46.0
All	26.1	20.6	23.0	30.5	42.5	39.4
			Poverty Gap (in percent) 1/			
Male	18.6	13.3	13.0	18.7	24.7	28.5
Female	24.5	16.0	14.2	23.9	27.5	34.5
All	19.8	14.1	13.3	20.2	25.0	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).
Notes:
1/ he poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

The age distribution of poverty in Table 8 highlights the extent to which poverty in Eastern Europe is concentrated among the very young and the very old. The average poverty incidence in Poland is 23 percent, but among children under ten it exceeds 30 percent. The numbers for Hungary show a similar pattern. In Bulgaria, the relative concentration of poverty among children is actually least. This is not a contradiction with the earlier finding that in Bulgaria poverty rates among households with three or more children are very high, because such households are quite rare in Bulgaria (much rarer than in the other two countries). Hence, in Bulgaria most children live in households with one or two children where poverty rates are lower.

Table 8: Poverty and Age

Age Bracket	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
			Headcount (P_0, in percent)			
0-4	29.0	30.0	35.3	33.3	46.4	47.9
5-9	28.2	26.0	31.6	32.0	46.0	42.9
10-14	24.2	20.9	27.6	34.1	41.1	40.5
15-24	24.1	19.7	23.6	26.4	41.8	36.6
25-34	23.5	21.7	26.2	27.6	43.3	41.6
35-44	18.8	17.1	21.3	28.6	38.2	34.7
45-54	20.2	13.7	16.0	24.1	35.2	29.7
55-64	27.6	15.6	14.5	31.6	42.6	41.7
65-74	35.0	23.6	18.3	37.0	47.6	45.0
75 & Over	47.5	37.7	22.1	47.9	41.4	45.9
All	26.1	20.6	23.0	30.5	42.5	39.4
			Poverty Gap (in percent) 1/			
0-4	21.2	14.8	14.2	20.4	24.9	29.6
5-9	18.7	13.6	12.9	17.6	24.8	27.5
10-14	19.5	13.2	12.4	18.6	23.6	25.9
15-24	18.7	14.1	12.8	18.5	24.1	28.4
25-34	20.1	13.6	13.5	20.3	25.8	28.0
35-44	17.7	13.5	12.6	18.7	24.1	27.6
45-54	17.0	12.9	13.6	20.8	24.8	30.0
55-64	19.2	13.9	14.5	21.4	26.1	32.5
65-74	20.6	14.4	14.2	22.0	28.5	35.2
75 & Over	26.1	17.4	15.4	26.0	34.2	37.7
All	19.8	14.1	13.3	20.2	25.0	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).

Notes:

1/ The poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

Poverty incidence in Eastern Europe decreases with age, and reaches a minimum at ages 35-44 in Bulgaria, ages 45-54 in Hungary, and ages 55-64 in Poland. After those ages, the increase in poverty incidence is quite rapid and severe, except in Poland (as we noted earlier, this is due to the generous pension system in Poland). In Bulgaria and Hungary, poverty rates among people over 75 are close to twice the national average. The vast majority of people in that age group are women, and their poverty rates are higher than for the men in that group. Actually, the gender-breakdown of Table 8 (not shown here) reveals that poverty rates among the elderly are higher for women in general than for men. At lower ages though, the gender gap is not very pronounced, and for some ages poverty is lower among women than men.

Gender is thus a relevant poverty dimension in Eastern Europe primarily for the elderly, especially at very high ages, and for female-headed households. For many women, the labor market changes of transition have had major implications. Prior to transition, women were expected to work full-time but the state provided day care for their children. Transition has led to a drop in female labor force participation (not all of it voluntarily) but it has also led to a reduced supply of affordable day care centers (World Bank, 1996e).[11] Both factors may well affect female-headed households disproportionately.

[11] The effect of transition on women is discussed further by Einhorn (1993), Funk and Mueller (1993), Chase (1995) and Fong (1996).

Nevertheless, the poverty figures suggest that in general the age-effect outweighs the gender-effect. This is clear also from Table 9 which classifies households by the number of elderly people (over 65) in the household. In Bulgaria and Hungary, households without elderly members have below average poverty rates and those with elderly members have above average poverty incidence. The latter increases with the number of elderly. Poland is again the exception, where age proves to be an irrelevant dimension of poverty. As discussed previously, Poland's pension system needs to be credited with this result.

Table 9: Poverty and the Elderly

Number of Elderly Members (Over Age 65) in the Household	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
			Headcount (P_0, in percent)			
0	21.9	19.5	22.8	28.5	42.1	37.3
1	33.9	23.7	24.1	39.1	45.0	47.4
2	38.2	27.6	22.3	36.4	39.4	42.4
3 or more	...	56.8	24.7	...	...	50.0
All	26.1	20.6	23.0	30.5	42.5	39.4
			Poverty Gap (in percent) 1/			
0	19.1	13.9	13.3	19.6	25.0	28.8
1	22.2	15.2	13.5	23.6	24.3	32.7
2	18.5	13.7	13.2	17.5	29.2	32.1
3 or more	...	7.4	13.9	...	...	58.4
All	19.8	14.1	13.3	20.2	25.0	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).
Notes:
1/ The poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

The poverty gap shows little variation by age, although it is above average among people aged over 65. It does not however increase systematically with the number of elderly in a household. In fact, in Hungary, it is the reverse—the poverty gap falls significantly in households with two or three elderly members. Many such households are poor, but they are not very far below the poverty line.

B. Former Soviet Union

Poverty is generally considered to have sharply increased in countries undergoing transition, partly because incomes are perceived to have become extremely unequally distributed, and mostly as a result of drastic declines in GDP. Indeed, a static comparison of the poverty rates for the FSU suggests that poverty is a serious problem in Russia and Estonia, and a nearly overwhelming one in the Kyrgyz Republic.

After five years of economic contraction, the poor in the FSU appear to be primarily the working poor, and especially the working poor with children. The working poor are testimony to the adjustment in wages, rather than in open unemployment, which has occurred. The myth of the pensioner—the idea that pensioners are especially vulnerable to poverty—is belied by several studies, including this one (World Bank, various poverty assessments in transition economies), although it is true that the extremely elderly (aged 75 and over) are more vulnerable to poverty. This sketch of the poverty profile seems relatively robust across equivalence scales—most of the poverty assessments cited used per capita measures, while in this study, the OECD equivalence scale is used.

Regardless of equivalence assumptions about economies of scale in consumption, family composition appears to have a major influence on the household's poverty status.

I. Pre-Transition Poverty and Macroeconomic Impact of Transition

Poverty in the FSU was hidden and unacknowledged, but it was a fact of life for approximately 6-10 percent of the population before the breakup of the country and the embarkation on transitions to the market economy by the FSU countries (Braithwaite 1990, 1991, 1995). Five years after gaining or regaining independence, poverty has become much more overt and has increased in scope. The large increases in measured poverty are due to three major causes: impact of severe macroeconomic declines including hyperinflation; sharp increases in income inequality; and measurement error, especially regarding the actual distribution of real consumption in the pre-transition period.

Any comparison to the pre-transition period is fraught with methodological pitfalls. Even the extent of macroeconomic declines is difficult to assess (Koen and Gavrilenko, 1994), although virtually no one would disagree that the FSU countries experienced especially sharp contractions in output starting in 1992. The hyperinflations experienced in 1993-94 by most FSU countries meant that the real value of wages, pensions, and other cash transfers plummeted abruptly. The hyperinflations and the breakup of the ruble zone led to macroeconomic disruption and a breakdown of the external trading relationships among the FSU. Without reasonable trading regimes and owing to the necessity for a complete realignment of production, real output declined precipitously.

At the same time that the size of the pie shrunk, its distribution became markedly more unequal. The only statistics available are based on income and on the family budget surveys, which are characterized by marked methodological shortcomings. Nonetheless, even a casual comparison suggests that the extent of open income inequality has become quite large during the transition (Milanovic, Forthcoming; Klugman and Braithwaite, 1998; Koen 1996, Commander, Tolstopiatenko, and Yemstov 1997).

A further complication stems from the prevalence of arrears in wages and pensions in the FSU countries, and the irregular nature of even formal state-sector employment due to forced administrative leave without pay and reduced working hours. Since the breakup of the FSU, wage and cash transfer arrears have become common as countries have grappled with the introduction of stabilization programs and fiscal austerity. Budgetary sequestration in Russia, Armenia, and Kyrgyz Republic resulted in long delays for wages in the "budgetary sphere" (health, education, government/administration, the Armed Forces, law enforcement, etc.) and for cash transfers, including pensions and child allowances.

It is difficult to accurately measure "official" or "registered" income given the prevalence of arrears, but it is practically impossible to quantify the informal sector in transition economies. In the FSU countries, households have been extremely reluctant to report most of their income, even to survey researchers, much less to the tax authorities. (Koen and Gavrilenko, 1994). Most studies suggest that the informal sector is around 40 percent of official GDP (Kaufmann and Kaliberda, 1996). In this study, total reported household income as a percent of total household expenditures varied from less than 50

percent in the Kyrgyz Republic to more than 95 percent in Estonia. However, the difference between reported income and household expenditures is large enough to mean that conclusions about the distribution of consumption inferred from the distribution of income are problematic. This is one of the reasons why the poverty profile in this study is based on household expenditures.

It is also futile to compare exactly the distribution of consumption before and after transition. During the pre-transition period, wages and prices were controlled and food and other consumer goods were allocated by queuing, rationing, and favoritism. Neither money income nor money expenditure reflected adequately the household's real consumption, since much of that real consumption was allocated to the household through non-market, non-money means. For example, senior workers at larger enterprises received better housing than junior workers at smaller enterprises, and they had shorter queues for purchasing automobiles, etc. Without ever considering their money income, it is clear that senior workers were better off. Unfortunately, there is no reliable way to reconstruct the real consumption of the poor and non-poor prior to transition, due to the absence of reliable, non-biased household data sets.

II. Who are the Poor After Five Years of Transition?

The working poor predominate in the poverty profile for the FSU countries. By and large, in Estonia, Russia, and the Kyrgyz Republic, the head of household of poor families is employed, most often in the state sector. Results indicate that poverty rates in rural areas are much higher than in urban areas.

Location

In most countries, where a family lives has a significant correlation with poverty. In the FSU and particularly Russia, there is a strong regional component to poverty, relating to the legacy of the planned economy. There are many one-company towns in the FSU which produced military-industrial goods for which demand has either disappeared or sharply declined. Russia has its "rust belt" where textile production has been displaced by competition from cheaper imports and service or other industry has not developed to fill in this gap. Additionally, the quality, irrigation, and altitude of agricultural land varies, which means that rural poverty is not homogenous.

In all the countries compared in this paper, urban poverty is markedly lower than rural poverty, and the poverty rate in the capital city is the lowest (except in Hungary, Table 1). For the East European countries, this is a conventional finding. In many countries of the world, the rural poverty rate is higher than the urban poverty rate, and the higher living standards of urban regions were portrayed as the major explanation for rural-urban migration many years ago (Harris and Todaro, 1970). However conventional this finding may be for Eastern Europe, it is not standard for the FSU. In almost every World Bank poverty assessment completed to date for FSU countries, rural poverty has been found to be somewhat less or markedly less severe than urban poverty both in terms of the headcount and in terms of various measures of severity.[12]

[12] World Bank, 1995 a-c, 1996 a-d.

The HEIDE data set may lead to different conclusions for two reasons. First, conditions in the transition countries may have changed from the time period referenced by the Poverty Assessments and that covered by the HEIDE data base. Second, as described in the methodological section, the HEIDE data base uses an equivalent adult approach (which was not usually followed in Poverty Assessments), a relative poverty line, and relied on self-reporting for the value of food produced by the household for its own consumption. In most of the World Bank's poverty assessments for the FSU, the value of food produced on private plots was imputed, usually based on the purchase prices reported by all the households in the sample. Imputing the value of food this way tends to lead to a higher consumption aggregate than asking respondents to assess the market value of their food production.

In Estonia, there is little difference between the depth of poverty in Talinn, the capital, in other cities, or in rural areas as measured by the poverty gap. In Kyrgyz Republic, the average poverty gap seems to be most affected by the higher poverty gap in other cities, since there is little difference between the poverty rate in the capital and the countryside. In Russia, the poverty gap is highest in rural areas and noticeably lower in the capital.

Family Composition

It is a truism of poverty studies that family composition is one of the most significant correlates of poverty, since the number of earners and dependents has a critical impact on the family's consumption needs and ability to fulfill those needs. In the FSU, however, family composition does not correlate as strongly with poverty as it does in

Eastern Europe or in many other countries of the world (Tables 2 and 3). For example, consider the issue of children. In this study, children were defined to be under the age of 15, which corresponds to the statistical definition of labor activity previously used in the FSU, where those aged 0-14 were assumed to be outside of the "available labor resources" of the country.[13]

In most poor countries, families with children are worse off than families without children, and families with more children are worse off than families with few children. The first part of this generalization seems to apply only weakly to the FSU countries in terms of poverty rates, while the latter part seems to be clearly demonstrated in Estonia and Russia, but only to a lesser extent in Kyrgyz Republic. Considering aggregated family composition, in all three countries, families without children and without elderly members are less likely (Kyrgyz Republic) or much less likely (Estonia, Russia) to be poor than families with either. In Russia and Estonia, the highest poverty rates were experienced by families with both children and elderly members (52 and 35 percent, respectively). The Kyrgyz Republic showed the lowest degree of variation of poverty rates according to family composition.

These findings are influenced by the overall demographic characteristics of the populations compared. The Russian and Estonian populations are much more aged than

[13] This definition of "children" as under the age of 15 is arbitrary, as are all definitions that do not correspond to the age of legal majority, which in most of the countries in this study was 18. However, children aged 15-18 have significant economic potential, and in the FSU, could usually drop out of school around the age of 14 during the period when the surveys were conducted.

Kyrgyz Republic, and the birthrate in Estonia is even lower than that in Russia, which is itself very much lower than the birthrate in Kyrgyz Republic. The relative youth of Kyrgyz Republic population and the widespread prevalence of children means that very few Kyrgyz Republic households are without at least one young dependent (14.4 percent), while nearly half of families in Estonia (49.5) and Russia (44.5) do not have a child.

In Estonia, families with three adults and three children, single-parent families with one or more children, and single female adults have the highest poverty rates, but poverty is most severe for single persons living alone. In Estonia, the dependency burden is more associated with care of the elderly than for children. Families with children comprised only 53 percent of the poor, and families with two adults and any number of children had a lower poverty rate than average. In contrast, families with one or two elderly members were poorer than average. About 18 percent of the poor are aged 65 or above, and given the differential male-female survival, approximately three-quarters of the elderly poor are female (Table 8).

In Russia, out of all poor individuals, approximately 60 percent live in families with children, while slightly more than 40 percent live in childless homes. However, the poverty rates and gaps are higher for single person households than in single-parent households and significantly higher than two-adult households with one or two children. This is an unusual finding, and the fact that one of the highest poverty rates recorded was for a single male adult family type is even more surprising. One would expect that a single male adult would have no dependents and presumably would have a reasonable earnings potential. Age only partly explains this finding, since two-thirds of these single male

adults are *younger* than 65. For single Russian females, the poverty rate was high but so too was the share (60 percent) aged 65 or older.

Other findings for Russia are more conventional. Families with three or more children have the highest poverty rate in the sample (but not the highest poverty gap). Families without an elderly member (aged 65 or above) have a much lower rate than families with one or two elderly members. In Russia, more of the poor have children than are responsible for an elderly member. However, those families with elderly members have a higher poverty gap than families with children.

In Kyrgyz Republic, a single female living alone was the household/family with the highest poverty rate and gap, followed by a many-child household with only two adult members. This is probably related to the situation of the elderly who do not comprise as high as share of the poor or total population, due to the younger age-structure of the population. Additionally, in Kyrgyz Republic, having a child is fairly universal—only 14 percent of all families or of poor families do not have at least one child.

Even though most families with two or three children are not poor, there are so many of such families in Kyrgyz Republic that they constitute the clear majority of the poor—families with three or more children comprise 53 percent of the poor, while families with two or more children are 72 percent of the poor. Such families are less likely to be severely poor, though, as their poverty gaps are lower than those of single females or males, or interestingly enough, of two adults without children.

Labor Force Participation

Aside from the truism that the more income-earners in a household, the better off the household is, there are some unexpected differences about the relationship between labor force participation and poverty in the FSU transition economies relative to other countries. The first difference is that in the FSU, participating in the labor force does not always mean that the participant is paid anything at all. Due to the pervasive wage and cash transfer arrears (notably for pensions, but also for child allowances), the notion "working poor" takes on a whole different meaning. Indeed, there are many who are working poor but would not be poor if their salaries were paid, and there are pensioners that would not be poor if their transfer payments were received on time.

In 1997, Russia announced a commitment to clear pension arrears by the end of the year. Previously, and during the survey period studied here, pension arrears were averaging anywhere between three and nine months, with some more remote areas having much longer lags in payment than in the well-off areas such as Moscow and St. Petersburg. On the other end of the spectrum, Estonia initiated a pension reform in 1993 which reduced differentiated pensions, eliminated pension payment arrears, and provided for gradual increases in the retirement age.

In addition to arrears, the phenomenon of retaining workers by forcing them to work reduced hours (short-time) or to be on unpaid administrative leave (forced leave) was widespread in Russia and Kyrgyz Republic.

A second difference between the transition economies of the FSU and other developing economies is that the stigma of reporting that one is out of work is arguably greater, while the entitlement attitude that one deserves a pension or allowance is perhaps larger than in other country contexts. This is due to the legacy of the previous system, in which labor was perceived as the right and obligation of anyone who was able-bodied, but that those who had contributed previously to the labor market would be protected in old-age or during periods of temporary "disability" (e.g. pregnancy or illness). These attitudes are likely to evoke positive answers to survey questions such as "do you work?" or "do you have a job?" in conditions which might receive negative answers in other country contexts. Nonetheless, unemployment rates calculated from the HEIDE data are higher than both registered unemployment in the FSU and the rate of unemployment benefit receipts reported by HEIDE respondents, reflecting the extreme difficulty of qualifying for an unemployment benefit and its short duration, especially in Russia and Kyrgyz Republic.

A third particular aspect of the labor market in the transition economies of the FSU is that it is extremely in flux, as the private sector emerges, and the informal labor market offers as many opportunities at the top end of the scale as it does at the bottom. Given the historic legacy in Russia and the other FSU countries, where entrepreneurial behavior has always been regarded with extreme distrust, it is truly difficult to determine the extent of entrepreneurial business and earnings. As a result, it is quite possible that the number of respondents who report that they work in the private sector might be understated. It might be preferable for a person who has a state sector job "in name only" to maintain that legal affiliation while in essence running a full-time business on the side.

With these caveats in mind, the conclusions about poverty and labor market participation for the FSU countries are rather conventional (Tables 4 and 5). Households with employed heads have lower poverty rates than those with unemployed heads, while the addition of one or two household members who are unemployed sharply increases the poverty rate. In Estonia, a third unemployed member increases the poverty rate further, but this is not the case in Russia and in Kyrgyz Republic, perhaps for some of the reasons detailed above. However, all three countries demonstrated an increasing poverty gap with each additional unemployed household member.

Some occupations or socio-economic groups are associated with a lower poverty rate than others. In all three countries, self-employed household heads live in households with a lower poverty rate than average, as do heads who describe themselves as wage-earners. However, those self-employed heads who are poor are poorer than average in Estonia. In all three countries, wage-earners live in households with a lower poverty gap. Households with pensioners and other transfer recipients as household heads have sharply higher poverty rates than average, but their average shortfall in expenditures is not markedly different from average.

Households with access to land—a private plot—had lower poverty rates than households without land, and the poverty gap was smaller, in Estonia and Kyrgyz Republic (Table 10). Unlike other studies of Russia (Klugman 1997, World Bank 1995b, Kolev 1996), this study found that Russian households with a plot were poorer than households without. As noted above, the change in methodology from imputing the value

of private plot produce to relying on self-valuation may explain partially why this result was obtained.

Table 10: Poverty and Ownership of a Private Plot

Whether the household has a private plot	*Bulgaria*	*Hungary*	*Poland*	*Estonia*	*Kyrgyz Republic*	*Russia*
No plot	26.6	...	18.5	34.4	48.2	38.1
Has plot	25.6	...	26.5	27.7	39.1	43.5
All	26.1	20.6	23.0	30.5	42.5	39.4
	Poverty Gap (in percent) 1/					
No plot	21.6	...	13.6	21.4	28.1	29.1
Has plot	17.2	...	13.2	19.2	22.2	31.8
All	19.8	14.1	13.3	20.2	25.0	29.8

Source: Household Expenditure and Income Date for Transition Economies Data Set (HEIDE).
Notes:
1/ The poverty gap is the poor's average shortfall in expenditures from the poverty line, expressed as a percentage of the poverty line (this measure is also known as the expenditure gap ratio).

Education of the household head has a strong influence on the household's poverty status, with the lowest headcounts achieved by those with university education (Table 6). In all three countries, households headed by those with primary education or less than complete primary education had poverty rates higher than average, and higher than those with secondary education. The depth of poverty paralleled the poverty rates, with the highest poverty gaps for those with primary or less education, followed by secondary and vocational-technical education. The poverty gaps for those poor with higher education were below average.

Gender and Children

Unlike most of the World Bank's poverty assessments, this study suggests that gender is a significant dimension of poverty (Table 7) in the FSU. In the three FSU countries, the poverty rate was sharply higher in households headed by women as opposed to men, with this difference being largest in Estonia and smallest in Kyrgyz Republic. Additionally, female-headed households were poorer than comparable male-headed households as their poverty gaps were larger, although this difference was not as pronounced as the difference in poverty rates.

Given the differential survival rates of women and men, for all three countries, women comprise an increasing share of those who are poor as age increases. Half or even less than half of poor children are girls, but by age 65 and over, women are approximately 70-75 percent of the poor. The elderly aged 65 and above are also poorer than average, as measured by the poverty gap. This means that elderly female poverty is more pervasive as well as deeper than male poverty in the Former Soviet Union.

4. Multivariate Analysis of Welfare and Poverty

The goal of the multivariate analysis of welfare and poverty is to assess the relative importance of various correlates of poverty and if possible, to attribute causality to these correlates. Additionally, determinants of welfare such as the demographic characteristics of households and the return to household assets, may differ between the poor and the non-poor, and the multivariate analysis will help to elucidate these differences. As was the case with the two-dimensional examination of poverty in the poverty cross-tabulation

tables, by and large, these goals were better met by results for the East European countries. Almost all the variables included in the models for the East European countries have estimated parameters significantly different from zero, and the pattern of results is very consistent across the three East European countries. Thus, while there remain important unidentified welfare determinants (e.g. personal ability), the model does point at a set of significant factors which affect welfare outcomes and which can be identified and affected in the context of policy intervention to alleviate poverty in Eastern Europe.

Unfortunately, the results are not so clear for the FSU. Overall, the explanatory power of the welfare regressions is low, and it is difficult to find as many clear poverty correlates as for the East European countries. In several ways, it can be argued that such a finding is not surprising, and relates to the different degrees of the transition process. In particular, the FSU still lacked much open unemployment during the HEIDE survey periods, although there was a strong correlation between actual unemployment and poverty. Further, in the FSU the labor market and especially the private sector are not well-defined, and it is difficult to determine a priori who are likely to be the losers and winners, since many of the traits associated with winning in the new regimes (entrepreneurial skills, political connections) are extremely difficult to measure reliably by a household survey. However, those aspects which could be measured in the household surveys (access to a household business or private plot) were strongly associated with the ability of a household to avoid poverty in the FSU.

A. Eastern Europe

Welfare Equations

Several general observations emerge from the estimation results in Table 11. While moderate, the overall goodness-of-fit is in line with typical results for this type of equation (R^2 ranges from 0.267 to 0.301). The reported results are for the log-linear functional form. These were compared against the results from the linear form, using the test developed for that purpose by Davidson and MacKinnon (1981). In each case the test results pointed at the superiority of the log-linear specification. This implies that effects of household characteristics on welfare are proportional rather than linear. For example, the effect of education is to increase expenditure per equivalent adult in a fixed proportion, rather than with a fixed amount (i.e. the absolute returns are lower for the poor).

Table 11: Welfare Equations (OLS): East European Countries
Dependent Variable = ln (household expenditure per equivalent adult)

	Bulgaria		*Hungary*		*Poland*	
	Parameter Estimate	*Standard Error*	*Parameter Estimate*	*Standard Error*	*Parameter Estimate*	*Standard Error*
Intercept	8.558*	0.122	9.424*	0.042	7.556*	0.036
Number of children	-0.064*	0.013	-0.075*	0.005	-0.091*	0.003
Number of male adults	-0.065*	0.015	-0.012	0.007	-0.022*	0.005
Number of female adults	-0.039*	0.014	-0.011	0.007	-0.017*	0.005
Number of elderly	-0.084*	0.020	-0.039*	0.010	-0.025*	0.007
Education of head: primary	-0.235*	0.024	-0.228*	0.011	-0.195*	0.008
Education of head: vocational/technical	0.066*	0.037	-0.109*	0.011	-0.098*	0.008
Education of head: university	0.117*	0.029	0.135*	0.014	0.207*	0.011
Age of head	0.021*	0.005	0.017*	0.002	0.011*	0.001
Age of head squared	-0.000*	0.000	-0.000*	0.000	-0.000*	0.000
Female head	-0.117*	0.025	-0.063*	0.009	-0.058*	0.007
Household owns enterprise	0.321*	0.043	0.163*	0.015	0.229*	0.014
Household owns land	0.178*	0.022	—	—	0.033*	0.007
Household is renter	-0.326*	0.038	-0.173*	0.010	-0.047*	0.007
Share of wages in household income	0.318*	0.036	0.172*	0.018	0.141*	0.012
Number of unemployed in household	—	—	-0.102*	0.009	-0.120*	0.007
Head is unemployed	—	—	—	—	—	—
Head is inactive	—	—	-0.035*	0.017	-0.007	0.011
Location: non-capital city	-0.140*	0.027	0.017	0.010	-0.095*	0.011
Location: village	-0.246*	0.033	-0.007	0.011	-0.198*	0.013
Number of observations	2465		8104		16,050	
R^2 (adjusted)	0.288		0.301		0.267	
F-statistic	63.39*		205.56*		325.47*	

Note: * Indicates that estimated parameters are significantly different from zero at the 90 percent confidence level.

The general pattern of findings is that education and the ownership of a household enterprise have the largest effects on welfare outcomes, followed by the nature of the household's link with the labor market. Demographic characteristics are a distant third. Some countries (Bulgaria) show strong location effects, while others (Hungary) show almost none.

In Bulgaria, ownership of a household enterprise, owning one's home, and deriving all household income from wages each imply increases of household welfare in excess of 30 percent. No single variable has such high welfare premium attached to it in Hungary or Poland. In Hungary, the strongest effect comes from primary education (negative 23 percent relative to the reference category of secondary education). Enterprise and home ownership, and a wages-only income each add 16-17 percent to household welfare. In Poland, the strongest welfare determinant is also a home enterprise (23 percent), but wage-income and home ownership have smaller effects (14 percent and 5 percent, respectively).

The results clearly indicate the key role played by education in transition economies. In Bulgaria, households where the head did not achieve more than primary education, have a welfare level 23.5 percent below that of the reference category (a household where the head has secondary education). This welfare "penalty" for low education is similar in the other two countries. Vocational and technical education is associated with a small welfare gain in Bulgaria, relative to secondary education, but with a welfare loss in Hungary and Poland. The likely explanation is that Bulgaria is not yet as far advanced in its transition as the other two countries, and still has many unconverted

state industries where the pre-transition vocational and technical education continues to have a high pay-off. The conversion process in the other countries has put a premium on job flexibility, and the more general secondary education and especially university education have proven to lend themselves better to the needed adaptation. This is reflected in the higher coefficients for university education in Hungary and Poland relative to Bulgaria.

These results underscore the crucial importance of general education (especially post-secondary education) for a successful long-term strategy in coping with transition. The huge gaps in the return to education between the primary and higher levels point at the unequalizing effect on the distribution of household welfare which is likely to result from transition. It is not practically possible to "upgrade" people's education in the short run—particularly since almost 2/3 of heads of households in the East European countries have primary or vocational/technical education levels. These households will progressively fall behind as transition proceeds, unless they can be re-schooled or re-trained. There is evidence that following transition the distribution of wages has become more unequal in Eastern Europe (Milanovic, 1995), and our results indicate that this effect from education extends to the overall distribution of household welfare as well.

The poverty profiles earlier in this paper, as well as other analyses of poverty in Eastern Europe (Grootaert, 1995, 1997a) have highlighted the strong correlation between poverty and open unemployment. Unemployment is perhaps the most visible aspect of the social cost of transition and it has severe distributional implications. The results in Table 11 indicate that over and above other household attributes (some of which, such as

low education, increase in themselves the probability to be unemployed), the presence of an unemployed household member reduces household welfare by 10-12 percent.[14] A significant number of households in Eastern Europe have more than one unemployed member.

As one can expect, household size is negatively related to household welfare (since we defined the latter as household expenditure per equivalent adult). However, what is of interest is the role of household composition, as reflected in the magnitude of the coefficients for each type of household member. Except for Bulgaria, the strongest negative coefficient is found for the number of children. The implication is that households do not succeed in maintaining their welfare levels when the number of children increases—in spite of the generous social transfers in Eastern Europe and the presence of general entitlement programs such as the family allowances which are targeted on children. Given the positive correlation between household size and poverty, it may well be needed that child-oriented transfer programs move away from being general entitlements to being more poverty-targeted by paying larger amounts to poor families with children.

The pattern of the coefficients of the other demographic variables is country specific. With respect to age of the head of household, each of the three countries indicates an inverted-U life-cycle pattern with welfare levels rising over most of the adult

[14] One can assume that the effect is the most severe if the head of household is unemployed. Grootaert (1997a) contains some evidence to that effect for Hungary. Since the household head was defined as the main earner in the Poland and Hungary household surveys used for the HEIDE database, few heads of household are classified as unemployed for those countries.

age-range, and then falling in the elderly years. The turning points are 49 years of age for Bulgaria, 53 years for Hungary, and 68 years for Poland. This may suggest differential effectiveness of the pension system to maintain welfare levels. We discussed the generosity of the Polish pension system previously, but other factors likely play a role, including private transfers and the ability (and willingness) of retired people to earn secondary incomes.

In each of the three countries, female-headed households have a lower welfare than male-headed households who are similar in all other characteristics. The shortfall ranges from 5.8 percent in Poland to 11.7 percent in Bulgaria. There appears to be a coincidence of demographic factors. In Poland, old age clearly matters least in terms of its impact on welfare levels (the age turning point is highest, and the coefficient of "number of elderly" in the household composition variables is lowest) and this is also the case for gender effects. In contrast, Bulgaria has the strongest age and gender effects, two to three times larger than those observed in Poland.

Lastly, we need to point at the country-specific location effects. In Hungary, the large welfare differences across locations are fully explained by the distribution of demographic and economic characteristics of households, and residual location effects are not statistically different from zero. In Bulgaria and Poland, in contrast, large location effects remain. Relative to the capital city, households living in other cities have a 10-14 percent lower welfare level, and those in villages are 20-25 percent lower, even after controlling for all household characteristics included in the model. This suggests that economic and social infrastructure, as well as other supply factors of economic activity,

have important locational inequalities. Indeed, it has been a characteristic of much of the transition in Eastern Europe that certain regions, such as those with traditional heavy industry, have suffered the most from transition due to the impossibility to convert such industries to privately-owned competitive firms. Similarly, the conversion of state-controlled agriculture to private farms has not happened without loss of income to many farmers (Milanovic, 1995).

Poverty Equations

As we discussed in Section 2, we are concerned about the effect of possible measurement error of household expenditure which could be correlated with some of the explanatory variables in the model (e.g. educated people report household expenditures more accurately; older people have more difficulty with reporting; households with self-employment income try to hide income and expenditure for fear of taxation). This could bias the coefficients of the welfare equation estimated by OLS. There is also a concern about the extent to which a given functional form fits the distribution. For both reasons, we estimated poverty equations with a binary dependent variable (poor/non-poor) using probit techniques. The consistency, or lack thereof, of probit results with the welfare equation results serves as a test for the presence of measurement-error or functional-form-fit problems.

The results in Table 12 suggest that the binary model provides a good fit. The model correctly classifies 77 percent to 82 percent of households as poor or non-poor, and as was the case with the OLS-model, almost all of the included variables have estimated coefficients significantly different from zero at the 90 percent confidence level. Table 12

Table 12: Poverty Equations (Probit): East European Countries

	Bulgaria		*Hungary*		*Poland*	
	Probability Derivatives	*Standard Error*	*Probability Derivatives*	*Standard Error*	*Probability Derivatives*	*Standard Error*
Number of children	0.039*	0.013	0.056*	0.006	0.062*	0.003
Number of male adults	0.052*	0.015	0.012	0.008	0.013*	0.004
Number of female adults	0.018	0.015	-0.006	0.008	0.004	0.005
Number of elderly	0.055*	0.020	0.020*	0.010	0.015*	0.007
Education of head: primary	0.171*	0.024	0.188*	0.014	0.161*	0.010
Education of head: vocational/technical	-0.056	0.037	0.077*	0.016	0.076*	0.009
Education of head: university	-0.085*	0.029	-0.091*	0.015	-0.094*	0.010
Age of head	-0.014*	0.004	-0.016*	0.002	-0.008	0.001
Age of head squared	0.000*	0.000	0.000*	0.000	0.000*	0.000
Female head	0.113*	0.027	0.031*	0.011	0.027*	0.007
Household owns enterprise	-0.169*	0.028	-0.078*	0.014	-0.102*	0.008
Household owns land	-0.131*	0.021	—	—	-0.029*	0.008
Household is renter	0.244*	0.047	0.172*	0.015	0.020*	0.007
Share of wages in household income	-0.272*	0.037	-0.136*	0.021	-0.122*	0.012
Number of unemployed in household	—	—	0.075*	0.010	0.078*	0.007
Head is unemployed	—	—	—	—	—	—
Head is inactive	—	—	-0.001	0.018	-0.022*	0.010
Location: non-capital city	0.029	0.029	-0.037*	0.012	0.018	0.014
Location: village	0.128*	0.037	-0.002	0.013	0.092*	0.017
Log-likelihood	-1199.3		-3418.7		-6677.6	
Chi-squared	503.95		1381.3		2291.7	
Prob > chi-squared	0.0000		0.0000		0.0000	
percent correct predictions	76.6		81.22		81.63	

Note: * Indicates significance of the underlying coefficient at 90 percent level probability. Derivatives are taken at the mean values of continuous variables or for discrete change of dummy variables from 0 to 1.

does not report the probit coefficients, but the probability derivatives at the mean of each continuous explanatory variable and for a change from zero to one in the case of dummy variables. The estimation used non-poor as the base category, hence the derivatives pertain to the probability to be poor.

Substantively, the pattern of determinants of poverty is entirely consistent with the pattern of determinants of welfare that was revealed by the welfare regression. All factors which are correlated with an increase/decrease in welfare are correlated with a decrease/increase in the probability to be poor. Hence, qualitatively the poverty regression adds nothing to the findings from the welfare regression. However, there are some quantitative differences, in terms of the relative magnitude of the effects. This is to be expected of course, since the poverty regression uses different information than the welfare regression. A case in point is the effect of education in Poland. In the welfare regression, university education was associated with a 21 percent welfare premium relative to secondary education, while primary education was associated with a welfare reduction of 20 percent, i.e. the two levels of education had symmetrical welfare effects around the reference category. In contrast, primary education increases the probability to be poor by 16 percentage points relative to secondary education, but university education reduces it by only 9 percentage points. In other words, university education is an important determinant of where on the welfare distribution a household will end up, and it has large absolute returns, but it has a lesser role as a determinant of poverty.

There are several similar patterns in the shift of relative roles of variables between the welfare regression and the poverty regression. These shifts have implications for the

targeting and design of poverty alleviation interventions. Foremost is the role of household enterprises. In Bulgaria and Poland, ownership of a household enterprise makes the largest or second largest positive contribution to household welfare—a clear reflection of the post-transition emergence of the small-scale private sector. These enterprises do reduce the probability that the household is poor, but the estimated effects are smaller than several other variables such as education or the share of wages. The contribution of household enterprises is hence more important in the upper part of the distribution, and one characteristic of the poor in transition economies is that they have not yet successfully got involved in the private sector as entrepreneurs.

Important differences between the welfare and poverty regressions also occur in the demographic and location variables. While both models underscore the correlation between number of children and low welfare or poverty, they fail to do so for other categories of household members. E.g. in Bulgaria and Poland, additional female adults in the household are associated with lower household welfare, but this does not increase the probability to be poor. In Bulgaria, the coefficient for male adults stands out as much higher than in other countries, and could indicate the difficulties in that country for men in their prime earning years to find adequately paid employment.

The results for location also deserve highlighting. The degree to which regional or locational targeting of poverty interventions is desirable and useful is frequently a major issue. The answer is different for each country but it is important to underline that the answer given by the welfare regressions is not the same as that given by the poverty regression. This is simply saying that the geographic distribution of welfare is not the

same as the geographic distribution of poverty.[15] Specifically, in Bulgaria and Poland, the probability to be poor does not differ between the capital city and other urban areas (after controlling for all other variables), even though the latter areas have significantly lower welfare levels. In the rural areas of these two countries, however, there is a higher probability to be poor, which is consistent with a negative welfare effect. Hungary is unique in that, *certeris paribus*, the probability to be poor is less outside the capital city.

Poverty Gap Equations

Table 13 presents Tobit estimation results for the right-censored subsample of poor households. As we discussed in Section 2, this model is conceptually equivalent to estimating the determinants of the poverty gap (i.e. the depth of poverty). The coefficients reported in Table 13 are directly comparable to the OLS coefficients of the welfare model which was estimated over the full sample (see Table 11). This comparison provides a test whether constant parameters apply for the entire welfare distribution. It is clear that for the majority of variables this hypothesis is rejected: returns to assets and contributions to welfare from other household characteristics are not the same for the poor and the non-poor. In most cases, the coefficients are higher for the poor than for the full sample.

[15] This result is clearly sensitive to where exactly the poverty line is set.

Table 13: Poverty Gap Equations (Tobit): East European Countries

Dependent Variable: ln (Expenditure per Equivalent Adult) Right-Censored at Poverty Line	*Bulgaria*		*Hungary*		*Poland*	
	Parameter Estimates	*Standard Error*	*Parameter Estimates*	*Standard Error*	*Parameter Estimates*	*Standard Error*
Intercept	8.559*	0.184	9.273*	0.060	7.417*	0.055
Number of children	-0.085*	0.020	-0.078*	0.007	-0.093*	0.005
Number of male adults	-0.098*	0.023	-0.009	0.011	-0.027*	0.007
Number of female adults	-0.056*	0.023	0.003	0.011	-0.004	0.007
Number of elderly	-0.077*	0.031	-0.018	0.014	-0.021*	0.011
Education of head: primary	-0.285*	0.039	-0.252*	0.018	-0.225*	0.014
Education of head: vocational/technical	0.142*	0.071	-0.095*	0.020	-0.106*	0.013
Education of head: university	0.171*	0.057	0.164*	0.032	0.207*	0.028
Age of head	0.024*	0.007	0.022*	0.002	0.012*	0.002
Age of head squared	-0.000*	0.000	-0.000*	0.000	-0.000*	0.000
Female head	-0.173*	0.038	-0.038*	0.014	-0.042*	0.010
Household owns enterprise	0.355*	0.090	0.132*	0.028	0.236*	0.026
Household owns land	0.280*	0.035	—	—	0.055*	0.013
Household is renter	-0.346*	0.055	-0.207*	0.015	-0.025*	0.011
Share of wages in household income	0.528*	0.060	0.199*	0.029	0.220*	0.018
Number of unemployed in household	—	—	-0.115*	0.012	-0.114*	0.010
Head is unemployed	—	—	—	—	—	—
Head is inactive	—	—	0.007	0.024	0.045*	0.016
Location: non-capital city	-0.035	0.046	0.055*	0.016	-0.031	0.022
Location: village	-0.231*	0.053	-0.005	0.017	-0.142*	0.024
Log-likelihood	-1178.5		-2580.1		-5345.9	
Chi-squared	595.31		1501.56		2368.6	
Prob > chi-squared	0.0000		0.0000		0.0000	
SER	0.527		0.351		0.390	

Note: * Indicates that coefficient is significantly different from zero at 90 percent confidence level.

With respect to education, the main difference is that the welfare penalty associated with having completed only primary education, or conversely, the welfare benefit of secondary over primary education, is larger for the poor than for the population at large. It ranges from 22.5 percent in Poland to 28.5 percent in Bulgaria (the corresponding figures for the full sample were 19.5 percent and 23.5 percent). In Bulgaria, the welfare gain for the poor from vocational/technical education is 14.2 percent, against only 6.6 percent for the whole population. In Hungary and Poland, vocational and technical education lead to lower welfare levels relative to secondary education, and here the differences between the poor and the non-poor are small. The returns to university education are not different for the poor and non-poor in Poland, but in the other two countries the returns are much higher for the poor. All this suggests that re-schooling and re-training could have potentially high pay-offs in the context of a poverty alleviation program.

The returns to land ownership are also higher for the poor, especially in Bulgaria. The returns from ownership of a household enterprise—already the single most important welfare determinant for the population at large—are higher still for the poor in Bulgaria and Poland (but lower in Hungary). Clearly, the ability to participate successfully in the informal private sector is the key factor to reduce the depth of poverty in the East European countries considered here, and programs to promote private entrepreneurship are probably the most important ingredient in active labor market policies, from the point of view of poverty reduction. Of course, the results also suggest that obtaining a wage job is an equally or even more successful road towards reducing the poverty gap—the wage-

share variable has much higher coefficients for the poor than for the entire population. In Bulgaria, each increase in the share of wages in total income of 10 percentage points is linked with a rise in household expenditure per equivalent adult of 5.3 percent. In Hungary and Poland, the corresponding figures are 2.0 percent and 2.2 percent.

As far as demographic characteristics are concerned, the lower welfare experienced by female-headed households amounts to 17.3 percent for poor households in Bulgaria, against 11.7 percent for the population at large. In Hungary and Poland though, the welfare gap between female-headed and male-headed households is less for the poor than for the population. The welfare burden stemming from large households is significantly greater for the poor than for the non-poor in Bulgaria, but the evidence is mixed in other countries. Lastly, the location effects are smaller for the poor in Bulgaria and Poland, but larger in Hungary. This could reflect a greater effectiveness of the Hungarian social safety net in reaching the poor living outside the capital city.

In summary, the general finding from the poverty gap equations, in comparison with the welfare equations estimated over the full population, is that returns to human and physical capital are often higher for the poor than for the non-poor and that the promotion of access to such capital and upgrading of capital owned by households are sensible components of poverty reduction strategies in Eastern Europe. The role of other variables, especially household composition and location, also differs between the poor and non-poor, but the pattern of differences is country-specific.

On the methodological front, these results call for a certain amount of caution in using welfare regressions estimated over the full sample as a basis for poverty analysis.

Our results suggest that one of the basic assumptions of this practice, the constancy of parameters over the entire distribution, may not hold for a number of key variables, especially household assets.

B. Former Soviet Union

Welfare Equations

For consistency and also owing to a lack of specifications which performed better, the same specification for the OLS model used for Eastern Europe was used for the FSU. In general, the overall goodness-of-fit for the FSU countries is much lower than for the Eastern European countries, as shown by the R^2 measures reported in Table 14. The R^2 for Estonia is the only one close to the lower boundary for the East European countries, while the explanatory power of the equation is quite low for both Russia and Kyrgyz Republic. Most but not all of the determinants of welfare included in the specification had estimated parameters significantly different from zero, but there was no discernible pattern to these differences. For all the FSU countries, the number of children, female-headed household, household ownership of an enterprise, the share of wages in household income, university education of the head, and the location dummy variables were significant in determining expenditures per equivalent adult. These significant factors are in most cases, easy to measure, and can serve as the basis for policy interventions.

Table 14: Welfare Equations (OLS): FSU Countries
Dependent Variable = ln (household expenditure per equivalent adult)

	Estonia		*Kyrgyz Republic*		*Russia*	
	Parameter Estimate	*Standard Error*	*Parameter Estimate*	*Standard Error*	*Parameter Estimate*	*Standard Error*
Intercept	7.301	0.089	9.627*	0.191	1.068*	0.120
Number of children	-0.080*	0.012	-0.060*	0.013	-0.123*	0.015
Number of male adults	-0.057*	0.021	-0.029	0.023	-0.030	0.022
Number of female adults	0.011	0.017	0.025	-0.022	0.019	0.020
Number of elderly	-0.047	0.022	-0.061	0.041	-0.021	0.025
Education of head: primary	-0.076*	0.023	0.045	0.060	-0.084*	0.036
Education of head: vocational/technical	...	...	0.102*	0.059	0.034	0.030
Education of head: university	0.214*	0.028	0.158*	0.060	0.147*	0.037
Age of head	-0.003	0.004	0.017*	0.009	0.010*	0.004
Age of head squared	0.000	0.000	-0.000*	0.000	-0.000	0.000
Female head	-0.103*	0.028	-0.191*	0.056	-0.141*	0.032
Household owns enterprise	0.174*	0.022	0.160*	0.042	0.235*	0.041
Household owns land	0.160*	0.021	0.249*	0.040	-0.043	0.029
Household is renter	-0.122*	0.019	0.064	0.070	0.024	0.026
Share of wages in household income	0.329*	0.032	0.205*	0.066	0.297*	0.040
Number of unemployed in household	-0.189*	0.026	...	...	-0.240*	0.038
Head is unemployed	...	...	-0.148*	0.071	...	...
Head is inactive	-0.119*	0.026	-0.056	0.061	-0.149*	0.037
Location: non-capital city	-0.196*	0.022	-0.338*	0.059	-0.365*	0.037
Location: village	-0.311*	0.028	-0.504*	0.059	-0.428*	0.043
Number of observations	2817		1929		5147	
R^2 (adjusted)	0.256		0.103		0.115	
F-statistic	57.95*		13.26*		38.08*	

Note: * Indicates that estimated parameters are significantly different from zero at the 90% confidence level.

As was the case for Eastern Europe, testing the log-linear specification against the linear form (Davidson and MacKinnon, 1981) demonstrated that the log-linear form was preferred. This means, for example, that the effect of adding an additional child is to decrease household welfare (expenditure per equivalent adult) in a fixed proportion, implying that the absolute costs of adding a child are lower for the poor.

In the FSU, locational factors have the strongest effect on household welfare, followed by the share of wages in household income, whether the household has a household enterprise, and higher education. These general findings are discussed in detail below.

In the FSU, the strongest effects on welfare were related to household location, with the sharpest change in household welfare (increasing it by 50 percent) implied by moving from a rural area to the capital in Kyrgyz Republic. Even moving from an urban area to the capital, Bishkek, would increase household welfare by one-third. The location effects are nearly as strong in Russia (43 percent rural-to-capital, 37 percent urban-to-capital) and not inconsiderable in Estonia (with rural-to-capital shifts increasing welfare by nearly one-third).

The dominant role of location, especially location in the capital city, has been documented in other FSU countries such as Armenia and Ukraine (World Bank 1996a, 1995c). In many ways, this finding demonstrates the slowness of transition and of business-encouraging reforms and private sector development, as well as questions of scale in many small FSU countries. Aside from Russia (and possibly Ukraine) most FSU countries are quite small in terms of population and GDP, so most private sector

development has been concentrated in the capital cities (which are often the only cities of any appreciable size).

The next most significant factors for increasing household welfare in the FSU were the household's entrepreneurial activity, either through owning an enterprise or farming a private plot of land, and the household's link to the labor market, as proxied by the share of wages in total household income. However, the ranking of these factors was country-specific. In Estonia, land ownership and owning an enterprise was significant but most important was the share of wages in household income, which can increase welfare by one-third. In Russia, land ownership was not significant,[16] but the share of wages in household income and ownership of household businesses were important, raising household welfare 30 and 24 percent respectively. In Kyrgyz Republic, after location, ownership of a private plot had the largest effect on welfare, increasing it by 25 percent, while household welfare increased 20 percent from increasing participation in the official economy (as captured by an increase in the share of wages in total household income).

In all three countries, the presence of an unemployed household head (or household member) was found to significantly decrease household welfare. In Estonia and Russia, specifications based on the number of unemployed demonstrated that adding an unemployed household member reduced household welfare per equivalent adult between

[16] This is possibly due to recording/measurement errors for this variable which is carried in the data set as hectares of land held by the household. When the raw data were examined, there were several improbable outliers. Unfortunately, removing these outliers did not significantly improve performance, nor did the subsitutation of a dummy variable for land ownership. The dummy variable did perform better in Russia than the number of hectares, so it was retained. Somewhat similar measurement problems also plagued the Kyrgyz Republic data (the two surveys were conducted by the same consulting group), but the dummy variable was significant for Kyrgyz Republic. In Estonia, a different survey and methodology recorded only whether the household had access to land, not the amount of hectares.

15 and 20 percent, respectively. In Kyrgyz Republic, the dummy variable for household head performed better (partly because of the lower number of "unemployed" in Kyrgyz Republic, where many family members work on the same private plot and are thus automatically not counted as unemployed) and resulted in reductions of welfare in the order of those in Russia. Additionally, in Russia and in Estonia, households headed by individuals not in the labor force (inactive heads) were associated with declines in household welfare of 15 and 12 percent, respectively.

The final significant factor was whether the household head had university education. In all three countries, welfare gains were approximately 15-20 percent. In Estonia and Russia, primary education of the head was also significant and in the expected (negative) direction, reducing household welfare about 8 percent in both cases. In Kyrgyz Republic, vocational-technical training was also associated with improved welfare—having a household head with it would raise household welfare 10 percent relative to a household head with secondary education. In Russia, however, vocational-technical did not have a significantly different return from secondary education.[17]

Demographic factors, except for the number of children and female headship, were generally not very important for household welfare in the three FSU countries. In each case, adding children meant reducing household welfare, from a low of a 6 percent reduction in Kyrgyz Republic to a 12 percent reduction in Russia. In Russia, there was a

[17] For Estonia, data on household heads with vocational-technical education were combined with households with general secondary education. Although the base data set for Estonia did have a very few individual household heads with vocational-education, they were few in number and their welfare level improbably high. It is possible that these households should have been classified elsewhere, but it was not possible to discern the exact definition differences that led to the non-comparability.

system of generalized child allowances but there were significant payment arrears and the take-up rate was low. Of families with children under 18, only 60 percent reported receipt of a child allowance (World Bank, 1995b). In Kyrgyz Republic, budgetary sequestration resulted in a withdrawal of the child allowance in 1994, and the substitution of a new benefit, the common monthly subsidy. In Estonia, fiscal austerity resulted in flat-rate pensions in 1993 and a withdrawal of social assistance benefits inherited from the Soviet Union.

In Russia and Kyrgyz Republic, increases in the age of the household head were associated with small increases in household welfare, but only in Kyrgyz Republic was there a discernible U-shaped life-cycle pattern. Other demographic variables were not significant, except for the number of adult males in Estonia.

Overall, these results underscore the critical role of the labor market in determining household welfare in the FSU. Those households, who have been able to most effectively capture the returns from their own labor and effort in owing family businesses or private plots, have been able to stay out of poverty. Individuals with university education seem to have been best suited to capture the new possibilities as domestic markets have opened up and economic control and regulation relaxed.

The importance of location, household participation in the labor market, and education in affecting household welfare presents formidable challenges to country authorities seeking to reduce poverty and to keep poor households from becoming poorer. Whether a household has a private plot or university-educated head are not easy factors to change in the short run, while the extreme locational disparities are so large as to be

unlikely to be rectified in even the longer term. However, the importance of entrepreneurial activity for increasing household welfare may very well be fostered by steps in the short- and medium-term, perhaps including public works and micro credit programs. In Russia, where non-governmental organizations have been especially active (Nizhnyy Novgorod, Yekaterinburg), credit unions and small business incubators have been set up.

Poverty Equations

Given the difficulties of conducting household surveys in the FSU (high refusal rates, extremely high reluctance to reveal sensitive information on income and alcohol consumption), it is not surprising that measurement error is a significant concern for the data sets on Estonia, Russia, and Kyrgyz Republic. Additionally, the lower levels of goodness-of-fit for the FSU countries noted above suggest that a binary dependent variable (poor/non-poor) estimated by probit techniques might perform better and would provide valuable information about some of the variables included. In this sense, lack of consistency between the probit and OLS results would demonstrate problems either with measurement error or in specification.

The probit results in Table 15 suggest an acceptable fit, but not a particularly good one. The model serves to predict correctly the poverty status of about three-quarters of Estonian households, but only 60-65 percent of Russian and Kyrgyz Republic households. As was the case with the OLS results, not all coefficients were found to be significantly different from zero at a 90 percent confidence level, and a small subset of the coefficients which were significant in the OLS were not significant in the probit (Estonia: primary

education and inactive head; Russia: primary education; and Kyrgyz Republic: two education variables and unemployed head). In Russia, the tenancy status of the household was significant for the probit but not for the OLS.

Results of the probit are reported in Table 15 as the probability derivatives at the mean levels of continuous variables, and for a discrete 0 to 1 change for the dummy variables. The estimation used non-poor as the base category, so derivatives with a positive sign indicate an increased probability of being poor and derivatives with a negative sign pertain to reducing the chance of being poor. Other than the four cases reported above where a variable was significant in OLS but not in the probit (or vice-versa), the results suggest that the determinants of poverty identified in the probit are essentially the same as the determinants of household welfare discussed in the preceding section.

Table 15: Poverty Equations (Probit): FSU Countries

	Estonia		*Kyrgyz Republic*		*Russia*	
	Probability Derivatives	*Standard Error*	*Probability Derivatives*	*Standard Error*	*Probability Derivatives*	*Standard Error*
Number of children	0.056*	0.012	0.020*	0.008	0.065*	0.010
Number of male adults	0.050*	0.021	0.008	0.014	0.011	0.014
Number of female adults	0.013	0.018	-0.010	0.014	-0.006	0.013
Number of elderly	0.037	0.022	0.003	0.026	-0.005	0.016
Education of head: primary	0.045	0.023	0.001	0.037	0.032	0.023
Education of head: vocational/technical	...	...	-0.027	0.036	-0.028	0.019
Education of head: university	-0.149*	0.029	-0.059	0.036	-0.094*	0.023
Age of head	0.003	0.003	-0.010*	0.005	-0.006*	0.003
Age of head squared	-0.000	0.000	0.000*	0.000	0.000	0.000
Female head	0.077*	0.028	0.119*	0.036	0.066*	0.020
Household owns enterprise	-0.135*	0.022	-0.094*	0.025	-0.127*	0.023
Household owns land	-0.159*	0.022	-0.092*	0.025	0.010	0.018
Household is renter	0.088*	0.019	-0.032	0.043	-0.046*	0.016
Share of wages in household income	-0.277*	0.033	-0.104*	0.041	-0.184*	0.025
Number of unemployed in household	0.115*	0.025	...	...	0.137*	0.024
Head is unemployed	...	...	0.036	0.044	...	...
Head is inactive	0.046	0.030	0.014	0.039	0.074*	0.024
Location: non-capital city	0.154*	0.024	0.195*	0.039	0.187*	0.025
Location: village	0.273*	0.032	0.266*	0.035	0.222*	0.030
Log-likelihood	-1504.8		-1241.5		-3201.8	
Chi-squared	494.53*		136.75*		478.38	
Prob > chi-squared	0.000		0.000		0.000	
% correct predictions	72.6		61.5		65.0	

Note: * Indicates significance of the underlying coefficient at 90% level probability. Derivatives are taken at the mean values of continuous variables or for discrete change of dummy variables from 0 to 1.

There are discrete quantitative differences in the coefficients estimated by the two procedures, which is as expected, since the probit equation is based on different information than the levels regression, although the rank ordering is much the same (except in Kyrgyz Republic). For example, in Estonia, share of wages in household income (increase of 33 percent) and location in a village (decline of 31 percent) had the largest effects on household welfare. In the probit, these two variables had the largest effect on the probability of the household's being poor, with changes in probability of 28 percent for both, with the appropriate signs. The main exception to the consistency of the findings was for primary education of the household head, which was found to reduce household welfare by 7 percent in the welfare regression but was not significant in the probit regression. Access to land was in fifth place for determining poverty but in eighth place for welfare. Aside from this minor reordering, there were no other significant changes. The first four variables which were most significant for poverty were also the most significant for household welfare: share of wages in household income, location in a village, university education of head, and non-capital city location.

In Russia, two factors (renting one's home status and age of head) were associated with poverty in the probit regressions but were not identified as contributing significantly to household welfare, while one factor which did reduce household welfare (primary education for household head) was not significant for poverty. However, these three variables were all relatively unimportant—renting reduced the risk of poverty less than 5 percentage points and age of head by less than one percentage point (the two lowest of the significant variables for poverty), while primary education reduced welfare by about 8

percentage points (the lowest of all significant variables for welfare). More significantly, the ranking of the first five variables remained the same for both poverty and welfare: rural, non-capital city, share of wages in household income, number of unemployed in household, and enterprise ownership.

In Kyrgyz Republic, the picture is less clear. The locational factors which were most significant for household welfare were also for poverty (rural and non-capital city respectively), but the probit found that female headship was in third place (increasing the risk of poverty by 12 percentage points while in the OLS, it was in fifth place (reducing welfare by 19 percent). The correspondence unraveled further for other factors. In the OLS, land access was third most important, raising household welfare by nearly 25 percent, but in the probit, land access was in sixth place and only reduced the chance of poverty by approximately 9 percentage points. The education variables which were found to be significant for Kyrgyz household welfare were insignificant in the poverty regressions, and the probit also did not identify an unemployed head as a risk factor for poverty, although it was found to reduce household welfare by nearly 15 percent.

Aside from some of the rerankings in the Kyrgyz Republic, the overall pattern of poverty determinants is consistent with the pattern demonstrated by the welfare regressions. The findings represent a challenge for social assistance authorities in the FSU countries, since the factors most significant for household welfare and poverty are ones that are extremely difficult to change in the short-run: location and share of wages in household income. Demographic characteristics (number of children, female-headed households) were generally statistically significant, but only increased the risk of poverty

slightly (usually under 10 percentage points) and less than reducing welfare (10-20 percent).

Poverty Gap Equations

Tobit estimates for the right-censored subsample of poor households are presented in Table 16. As discussed earlier, this formulation is essentially equivalent to estimating the determinants of the poverty gap, and the Tobit coefficients can be compared to the welfare regression coefficients estimated by OLS over the full sample (Table 14). This comparison is an informal test of whether the parameters apply to the entire welfare distribution, and is clearly rejected for many of the variables, which have Tobit coefficients sharply higher than in the OLS full sample estimate.

The welfare loss from living outside of the capital is dramatically larger for the poor than overall in Russia and Kyrgyz Republic, suggesting that rural poverty is more much severe and other urban (non-capital) poverty a significant problem. Rural poverty is also associated with a higher welfare loss to the poor in Estonia, although the welfare differential of location in a non-capital city is virtually the same for the poor as for the general population. The reduction in welfare of the poor to living in a rural area is greater than 60 percent in Russia and Kyrgyz Republic, and reaches nearly 40 percent in Estonia. In the non-capital urban areas, the reduction of welfare of the poor is 52 percent in Russia and 44 percent in Kyrgyz Republic, but only 19 percent in Estonia. These findings suggest

Table 16: Poverty Gap Equations (Tobit): FSU Countries

Dependent Variable: ln (Expenditure per Equivalent Adult) Right-Censored at Poverty Line	*Estonia*		*Kyrgyz Republic*		*Russia*	
	Parameter Estimates	*Standard Error*	*Parameter Estimates*	*Standard Error*	*Parameter Estimates*	*Standard Error*
Intercept	7.287*	0.122	-9.721*	0.249	1.124*	0.176
Number of children	-0.075*	0.016	-0.058*	0.017	-0.145*	0.021
Number of male adults	-0.060*	0.029	-0.034	0.030	-0.036	0.033
Number of female adults	0.004	0.024	0.032	0.029	0.038	0.030
Number of elderly	-0.031	0.030	-0.028	0.054	-0.000	0.036
Education of head: primary	-0.079*	0.030	0.028	0.078	-0.113*	0.052
Education of head: vocational/technical	...	...	0.086	0.077	0.083*	0.044
Education of head: university	0.265*	0.048	0.171*	0.079	0.256*	0.058
Age of head	-0.003	0.005	0.019	0.011	0.017*	0.007
Age of head squared	0.000	0.000	-0.000	0.000	-0.000*	0.000
Female head	-0.090*	0.038	-0.229*	0.073	-0.182*	0.046
Household owns enterprise	0.173*	0.033	0.205*	0.056	0.316*	0.064
Household owns land	0.228*	0.030	0.304*	0.053	-0.058*	0.042
Household is renter	-0.152*	0.027	0.115	0.095	0.052	0.039
Share of wages in household income	0.367*	0.046	0.289*	0.088	0.407*	0.058
Number of unemployed in household	-0.203*	0.032	...	...	-0.305*	0.053
Head is unemployed	...	...	-0.165*	0.093	...	...
Head is inactive	-0.112	0.040	-0.067	0.080	-0.193*	0.053
Location: non-capital city	-0.188*	0.033	-0.440*	0.085	-0.523*	0.065
Location: village	-0.366*	0.042	-0.615*	0.085	-0.637*	0.072
Log-likelihood	-1466.8		-1709.5		-4444.4	
Chi-squared	542.6		172.66		555.9	
Prob > chi-squared	0.000		0.000		0.000	
SER	0.506		0.918		0.968	

Note: * Indicates that coefficient is significantly different from zero at 90% confidence level.

the importance of developing a rural development & poverty reduction strategy, perhaps centered around land privatization which has moved very slowly in most of the FSU. Preliminary findings for Armenia strongly suggested the importance of the 1992 land privatization program in preventing rural poverty (World Bank, 1996a), which was significantly lower than urban poverty in Armenia during 1994.[18]

In Russia, the household link to the labor market in terms of the share of wages in household income followed locational factors as the third-most significant determinant of welfare of the poor, as for the general population, but the welfare premium of maintaining the wage-labor market link was more significant for the poor (increasing welfare 40 percent) than for the population at large (30 percent). In Estonia, the link to the labor market was identified as the largest determinant of overall welfare (increasing it by one-third), and this was also true for the poorer half of the distribution.

In Kyrgyz Republic, the share of wages in household income and access to land both had returns to the poor which were larger (29 and 30 percent) than to the general population (20 and 25 percent). This suggests that active participation in farming or the official labor market is an even more effective vehicle for reducing poverty than for increasing welfare overall. Access to land also was more important for reducing poverty

[18] At the time of this writing, of the FSU countries, only Armenia had instituted a full-scale land privatization program (1992) by which former state and collective farms had been broken up and all land holdings passed to individuals. In the other countries, households retained access to land through their private plots. Under Soviet law, rural and even urban households were entitled to a very small (less than 0.06 and 0.02 hectares respectively) plot of land. These land plots were passed from generation to generation, comprised 3 percent of arable Soviet land, and produced up to 25 percent of the gross output of (non-wheat) agricultural production. (Gregory and Stuart, 1990).

(raised the welfare of the poor 23 percent) than for raising welfare generally (increased welfare for the full sample about 16 percent) in Estonia. Land access was not found to be especially important for the poor in Russia, although it was significant in the Tobit regressions, unlike the OLS findings, but further interpretation is futile considering the measurement problems associated with this variable for Russia.

Demographic characteristics tended to demonstrate approximately the same effect on the welfare of the poor as on the welfare of the general population. Female-headship led to a larger reduction of welfare among the poor vis-à-vis the general population in Russia and Kyrgyz Republic (18 and 23 versus 14 and 19 percent, respectively), but this was not the case in Estonia where the level was essentially the same (poor 9, general 10 percent).

Lastly, education effects were found to be distinctly larger for the poor than the non-poor, suggesting that retraining and supplemental educational programs could have a distinct impact on poverty reduction, although the orders of magnitude of increasing welfare of the poor through education (10-30 percent) are much lower than the impact of rural location (60 percent).

Overall, the poverty gap equations demonstrate that although the returns to human and household capital are higher for the poor than for the general population, the overwhelming effect of location presents a significant challenge for poverty reduction. Without some sort of rural development strategy, and a corollary development strategy for non-capital urban areas in Russia and Kyrgyz Republic, it is difficult to postulate that conventional human capital development strategies will have a sufficient effect on poverty

reduction. At the same time that these countries are faced with the daunting challenge of rural and regional development, improved targeting of scarce social protection resources is imperative. We turn to this issue in the next section.

5. Means-Testing and Indicator-Based Targeting

In the previous section we explored the determinants of welfare and poverty, and of the depth of poverty. This has provided a number of useful findings, especially regarding the role of household assets and the link to the labor market, which can be used in the design of poverty reduction programs—either for the targeting of transfers, or in active employment creation policies. In this section, we try to answer the question whether indicator targeting is a feasible modus operandi in such policies. The indicators considered are the economic and demographic household characteristics which we used as regressors in the models. Indicator-targeting is useful in situations where an overall means-test is difficult to administer because it is costly and/or unreliable.

Indicator-based targeting is commonly used in East European and FSU countries for certain components of the social safety net[19]. Family allowances are allocated on the basis of the number of children. Eligibility for social assistance often relies on a combination of indicators pertaining to household size, ownership of durable goods (e.g. car or house), and employment status. It is generally not known how efficient such targeting mechanisms are in correctly identifying the poor.

[19] For a discussion of indicator-based targeting in other regions, see e.g. Grosh and Baker (1995) for Latin America and Subbarao et al. (1997) for other regions.

This can be checked empirically using the welfare or poverty equations we estimated in the previous section, by comparing predicted with actual values of the dependent variable and calculating the percentage of correct predictions. Below we report the results of one such exercise, based on an expanded welfare regression. As we discussed in Section 2, the expansion consists of adding variables for "official" income (wages and social transfers) and for ownership of household durables. Due to the endogeneity of these variables, no causal interpretation should be given to the coefficients. The purpose is simply to test their predictive ability. The model was estimated with forward stepwise regression.

The set of regressors—household durables, official income, demographic household characteristics, location, employment status—are all fairly easily identifiable indicators, of the sort that social workers could observe or ask about easily in the course of a visit to a household to determine eligibility for a transfer program. How well do they identify the poor?

A. Eastern Europe

Table 17 shows, for the three East European countries, the five and ten best predictors and the results in terms of identifying correctly poor and non-poor households. Overall, the results are impressive: the set of 25-30 indicators included in the model correctly predicts poverty status in about 80 percent of the cases. However, the model is clearly much better in identifying the non-poor, with an accuracy of 90 percent for Bulgaria and 97 percent in the cases of Hungary and Poland. For the poor, the results are

much worse, with no model reaching even 50 percent accuracy. Clearly, this is inadequate for real-life application.

Table 17: Stepwise Targeting Regressions (All Observations)
East European Countries

	Bulgaria	*Hungary*	*Poland*
		Best Five Predictors	
	Color TV	Car	Washing machine
	Education: primary	Wage income	Number of children
	Refrigerator	Color TV	Wage income
	Car	Number of children	Car
	Wage income	Education: primary	Number of male adults
		% Correct Predictions	
Poor	47.3	13.1	16.7
Non-poor	86.8	98.7	97.5
All	75.9	81.1	82.1
		Second Best Five Predictors	
	Number of children	Renter	Social transfers
	VCR	Number of unemployed	Household enterprise
	Renter	Washing machine	Education: university
	Household enterprise	Education: university	Number of unemployed
	Number of male adults	Household enterprise	Number of female adults
		% Correct Predictions	
Poor	35.5	24.7	22.7
Non-poor	92.3	97.2	96.7
All	76.6	82.4	82.6
		All Variables — % Correct Predictions	
Poor	45.4	30.7	24.8
Non-poor	90.8	96.6	97.0
All	78.3	83.1	83.2

Note: Dependent variable is the log of per equivalent adult expenditure. The regressors are the same as in the welfare and poverty regressions with the addition of wage and transfer income and consumer durables.

The results also show a remarkable robustness to the numbers of indicators used. In the case of Poland, the five best predictors do almost as good a job at identifying poverty status as the full set. In the case of Hungary, the best five variables identify the non-poor almost perfectly (98.7 percent) but correct identification of the poor improves significantly, from 13 percent to 31 percent, as more indicators are added.

It is noteworthy that several household durables keep coming back across countries as good predictors—car, color TV, washing machine top the list. These are clearly durables that identify the rich. Other critical predictors are number of children, ownership of a household enterprise, level of wage income, renting one's home, education, and number of unemployed in the household.

Given the apparent success of the model in identifying the rich, we undertook a second simulation. Suppose that the variable list identified in Table 17 was used to correctly identify the upper half of the distribution, how well would the set of indicators do to distinguish poor from non-poor households within the group of household below median welfare level?

The results in Table 18 show that the indicators are now quite able to correctly identify poor households: success rates range from a low of 60 percent in Poland to a high of 87 percent in Bulgaria (actual poverty rates in the below-median sample are respectively 38 percent and 55 percent). This is a very respectable performance and suggests that such approach is worth considering for real-life application. Moreover, in

Table 18: Stepwise Targeting Regressions(Observations Below Median)
East European Countries

	Bulgaria	*Hungary*	*Poland*
		Best Five Predictors	
	Refrigerator	Color TV	Washing machine
	Color TV	Renter	Number of children
	Education—primary	Car	Wage income
	Land ownership	Number of children	Social transfer income
	Wage income	Wage income	Number of male adults
		% Correct Predictions	
Poor	87.8	69.1	53.7
Non-poor	27.3	62.0	76.1
All	60.6	64.8	67.6
		Second Best Five Predictors	
	Number of male adults	Refrigerator	Car
	Number of children	Number of unemployed	Color TV
	Age of head of household	Education — primary	Number of unemployed
	Car	Social transfer income	Number of elderly
	Social transfer income	Sewing machine	Number of female adults
		% Correct Predictions	
Poor	87.3	65.6	57.8
Non-poor	32.5	70.9	74.8
All	62.7	68.8	68.3
		All Variables — % Correct Predictions	
Poor	86.7	67.8	60.4
Non-poor	35.9	70.9	75.0
All	63.9	69.7	69.5

Note Dependent variable is the log of per equivalent adult expenditure. The regressors are the same as in the welfare and poverty regressions with the addition of wage and transfer income and consumer durables.

Hungary and Bulgaria, the same level of correct identification of poor households was achieved with the five best predictors alone.[20] In Poland, going from five predictors to the full set yields an improvement from 54 percent to 60 percent correct predictions for poor households.

Interestingly, the set of predictors which emerges as the best is not that different from those which came out of the estimation over the full sample. Among durables, car and color TV are still the best identifiers. Among the other variables, household composition and official income are now more to the fore.

In summary, this exercise illustrates that a fairly simple set of observable indicators at the household level can be used to correctly identify 90 percent or better of non-poor households. This could serve as a first-step screen to eliminate better-off households from consideration in poverty-oriented programs. In a second step, the same indicators can be used to identify the poor from the non-poor in the remaining bottom part of the distribution. Success rates in this exercise were in the 60-87 percent range which is far better than what current social assistance systems in Eastern Europe achieve. Grootaert (1995, 1997a) has documented leakage rates of 47 percent of households in Poland and almost 90 percent in Hungary in the case of social assistance.

[20] Note that adding variables only ensures a better overall prediction rate. Predictions for the poor or non-poor separately may actually go down. This is the case e.g. for Bulgaria, where the best five predictors correctly identify 87.8 percent of poor households, but the full model identifies only 86.7 percent of poor households correctly. Overall prediction rate however rose from 60.6 percent to 63.9 percent.

There is thus significant scope to improve the targeting of social assistance and other poverty-oriented programs, and the simulation reported here indicates that indicator-based targeting can make a significant contribution. Our results suggest also that the list of indicators will need to be country-specific. While our results are indicative of the potential of indicator-based targeting, they are not a blue print for practical application. Specifically, results could undoubtedly be improved by testing alternative combinations of variables and by modifying scoring procedures. For example, the best predictors can be given a greater weight than what the regression implicitly gives them. This would improve results, and our findings must therefore be seen as a low-end estimate of the effectiveness of indicator-based targeting to identify poor households.

B. Former Soviet Union

The regression findings for FSU clearly suggested a link between welfare and poverty and such easily identified household attributes as location, the number of children and elderly members, and whether the household is female-headed. Certain traits, such as the link to the formal labor market and a household enterprise, were associated with higher levels of welfare.

Under the previous Soviet social welfare system, all benefits were categorical ones. For example, all males aged 60 and over received some sort of pension (regardless of whether they continued to work), which was also the case for all females aged 55 and above. Starting in 1992, all children under the age of 16 (or 18 if they were full-time students) were eligible for a general child allowance. Certain categories of people,

particularly the disabled received diverse benefits, such as free or reduced-price utilities and transportation services.

Since most of those who received such categorical benefits were demonstrated to actually be the non-poor (see various World Bank poverty assessments), categorical targeting received significant and warranted criticism from external and internal advisors and policy makers. However, the problem with categorical targeting may have been in the poor choice of categories more so than the idea of using an indicator or combination of indicators (a proxy means test) to identify the poor. The choice of categories was dictated by political considerations—not by a careful study of who was poor and what determined poverty.

In this section, we try to determine whether a combination of indicators can identify the poor, which in turn would provide the necessary information for effective targeting of cash or in-kind benefits, or for active labor market policies. The indicators used here are the same economic and demographic variables which were used as regressors in our previous models, with some additional variables. In practice, in the FSU, and particularly in Russia and Ukraine, increasingly benefits are being awarded to applicants who meet a categorical filter *and* an income-test. Typically, this means-test is based only on official income. As noted in the poverty profile section, in the FSU, official income is a particularly poor predictor of household welfare, due to the pervasive informal sector and the general unwillingness of households to disclose such sensitive information.

Preliminary evidence from the housing allowance subsidy programs in Ukraine and Russia, which are based on official income (wages plus transfer income) suggests that an

official income-test has a very high error of exclusion (those who are actually poor are not receiving the benefit). Partly this originates from the very different goal of these programs, which is to promote housing privatization, and partly it may originate from a lack of consideration of other factors related to poverty which are not captured in official income.

In order to improve means-testing where it currently exists, and to revise and update the categorical approach overall, we estimate an expanded welfare equation with variables added for official income (wages and social transfers) and for ownership of household durables. The data in Table 19 shows that the proxy means test was able to identify correctly the poverty/non-poverty status of approximately 65-75 percent of the population, with all three countries having better predictions for the non-poor than for the poor. Only about 60 percent (57-62) of the poor were identified correctly, but this still represent a significant improvement over the previous single-indicator/categorical approach used to allocate benefits such as old-age pensions and student stipends.[21]

At first glance, the five best predictors for the FSU countries seem to be more related to the non-poor side of the spectrum (wage income, car, color TV, household business, university education, land ownership) as to the poor (transfer income). The addition of the next five (best ten total) predictors shows a mixture of factors associated

[21] Analysis of individual countries (Russia, Kyrgyz Republic) in World Bank poverty assessments and comparative analyses (Krumm, Milanovic, and Walton 1994) found that in general, only child allowances were well-targeted transfers in FSU countries. All other transfers were regressive or highly regressive.

Table 19: Stepwise Targeting Regressions (All Observations)
Former Soviet Union

	Estonia	*Kyrgyz Republic*	*Russia*
		Best Five Predictors	
	Wage income	Wage income	Wage income
	Car	Car	Transfer income
	Color TV	Washing machine	Color TV
	Higher education	Color TV	Refrigerator
	Transfer income	Land ownership	Household enterprise
		% Correct Predictions	
Poor	53.3	57.4	56.4
Non-poor	75.7	67.0	76.2
All	70.3	63.6	68.9
		Second Best Five Predictors	
	Stereo	Number of children	Inactive head
	Household enterprise	Renter	Car
	Number of unemployed	Household enterprise	Location: other urban
	Inactive head	Location: rural	Location: rural
	Number of children	Location: other urban	Sewing machine
		% Correct Predictions	
Poor	58.3	56.7	57.1
Non-poor	76.8	68.1	77.0
All	72.5	63.7	69.5
		All Variables — % Correct Predictions	
Poor	61.9	57.1	56.9
Non-poor	77.1	68.6	75.5
All	74.5	64.0	68.9

Note: Dependent variable is the log of per equivalent adult expenditure. The regressors are the same as in the welfare and poverty regressions with the addition of wage and transfer income and consumer durables.

with higher welfare (stereo, car, household enterprise) as with low welfare (number of children, transfer income, rural location, other urban location, number of unemployed, inactive head). This addition does little to improve the fit, raising the overall correct prediction rate only slightly (64-73 percent) and the rate for the poor a bit more (57-58 percent) than was observed by using only the five best predictors. The full model shows a barely greater prediction accuracy.

Given the presence of so many variables associated with the higher end of the welfare distribution and the higher identification rates for the non-poor, we undertook a second simulation similar to what was done for the East European countries, but we found vastly different results. If there was some way to screen out the upper portion of the distribution, how well would the proxy means test distinguish among the poor and non-poor in the lower half of the distribution? For the Eastern European simulation, we assumed that the screen would correctly identify the upper half of the distribution, since the identification rates for the non-poor were all above 90 percent. Although this was a reasonable assumption for Eastern Europe, in the original expanded regression for the FSU countries, only 70-80 percent of the non-poor were correctly identified, thus making this assumption a bit more questionable. However, for consistency, we simply re-ran the expanded welfare regression via forward stepwise regression on the half of the FSU samples with welfare below the median.

The results in Table 20 demonstrate that such an assumed screen would somewhat improve the identification of the poor in Estonia (from 62 percent to 66 percent correctly identified) but would improve the identification of the poor much more in Russia and

Kyrgyz Republic, increasing to 80 and 83 percent respectively. Of course, there is a cost to this—the few non-poor which remained in the below-median sample were either poorly identified (Estonia), extremely poorly identified (Russia), or virtually unidentified (Kyrgyz Republic). This suggests that a proxy means test system could perform rather well in Russia and Kyrgyz Republic, and acceptably well in Estonia, provided that an effective mechanism could be found to screen out the upper portion of the welfare distribution. In all three cases even without the screen, the proxy means test would represent a significant improvement over the old categorical approach.

Further, in all three countries, the five best predictors alone did as good a job in identifying the poor (Kyrgyz Republic, Russia) or almost as well (Estonia) as did the full model, implying that only a few key data would be required for collection. As in Eastern Europe, the set of predictors which emerges as the best for identifying the poor (given that the upper 50 percent of the distribution was screened out of consideration) is more or less the same as which resulted from estimation over the full sample. Interestingly enough, for Kyrgyz Republic, using the below-median observations resulted in only six variables meeting the entry criteria for the forward stepwise regression: land ownership, wage income, car, motorcycle, renter status, and washing machine. For Russia and Estonia, more than 10 variables entered into the forward stepwise specification.[22]

[22] Restricting the observations to those below the median significantly improved identification of the poor in Kyrgyz Republic and Russia but worsened the identification of the non-poor, which thus prompted an additional experiment with other regressors, in an ultimately futile attempt to improve the predictions of household consumption. Adding "kitchen sink" variables like housing amenities (hot water, central heating, etc.) and an additional dummy variable for self-employed household head, resulted in error rates which were virtually identical to those for the original specification for Estonia and Kyrgyz Republic and which were only marginally better (2-3 percent) for Russia. This specification was therefore not further considered.

Table 20: Stepwise Targeting Regressions (Observations Below Median)
Former Soviet Union

	Estonia	*Kyrgyz Republic*[1]	*Russia*
		Best Five Predictors	
	Wage income	Land ownership	Wage income
	Transfer income	Wage income	Color TV
	Color TV	Car	Transfer income
	Inactive head	Motorcycle	Education: primary
	Number of unemployed	Renter	Refrigerator
		% Correct Predictions	
Poor	64.2	83.0	79.6
Non-poor	54.3	0.0	22.4
All	63.7	82.0	73.1
		Second Best Five Predictors	
	Land ownership	Washing machine[1]	Education: higher
	Location: rural		Land ownership
	Education: voc.-tech		Household enterprise
	Car		Renter
	Washing machine		Number of elderly
		% Correct Predictions	
Poor	65.4	83.1	79.6
Non-poor	63.1	9.5	22.2
All	65.2	81.5	73.0
		All Variables — % Correct Predictions	
Poor	65.5	83.1	79.5
Non-poor	61.1	8.7	21.8
All	65.1	81.3	72.9

Note: Dependent variable is the log of per equivalent adult expenditure. The regressors are the same as in the welfare and poverty regressions with the addition of wage and transfer income and consumer durables.

[1] Only six variables met the entry criteria.

Overall, the acceptability of the proxy means test for the FSU countries depends on the reasonability of the assumed screening device. Unlike in Eastern Europe, 90 percent or more of the non-poor can not be assumed to be removed from consideration through an inventory of their consumer durables and other factors. Only about 70-80 percent of the non-poor could be removed at best in the FSU. Once the non-poor are removed from consideration, virtually the same information collected could be used to further refine the identification of the poor and non-poor in the remaining portion of the welfare distribution, resulting in identification rates of 65-82 percent. Although the potential of proxy-means testing in FSU is not quite as impressive as in Eastern Europe, it could still be a significant improvement over the existing system of categorical indicators, which is plagued by very large leakage to the non-poor.

6. Summary and Conclusions

Poverty has emerged as a significant problem in the transition economies. Although more widespread in the Former Soviet Union, much "transitional" poverty has proved to be difficult to eradicate even in Eastern Europe. The social protection systems of the transition countries have been inadequate to meet the challenges of transition, being both poorly targeted and costly. Although the open incidence of poverty increased everywhere during the transition period, distinctly different patterns of poverty emerged from the East European experience than from the Former Soviet Union. In general, poverty correlates are more sharply defined in Eastern Europe than in FSU, holding out the potential for better targeting in Eastern Europe.

In this paper, we undertook a comparative analysis of poverty in three East European countries and three FSU countries. We used the HEIDE data set, specially constructed for that purpose. The analysis consisted of three tasks: a profile of the incidence and depth of poverty using aggregate poverty indexes (Section 3); a multivariate analysis of the determinants of poverty (Section 4); and an empirical evaluation of the role of means testing and indicator-based targeting in poverty alleviation programs (Section 5).

We also raised a number of methodological issues. For the poverty profile, we used the well-known P-alpha class of poverty indexes, disaggregated along relevant socioeconomic and demographic dimensions. We opted, however, for a relative poverty line, rather than the more customary approach of absolute lines in cross-country research. In doing so, we put the comparability of the poverty profile ahead of the comparability of

the headcount. When countries have significantly different levels of GDP, the same absolute line would cut-off from very small to very large proportions of the population, which are difficult to disaggregate and compare in a meaningful way.

For the multivariate analysis we took note of the current debate over welfare regressions and binary poverty regressions as the main analytic tool for poverty research, but we argued that in transition economies both are needed as they serve different purposes. While welfare regresssions utilize the maximum available statistical information on the dependent variable, they ignore measurement errors of the type typically present in transition economy databases. In our results, the two models provided qualitatively consistent answers on the significant determinants of poverty and welfare, but underlined that some variables, such as education and productive assets, play different roles in escape from poverty as opposed to determining position on the nonpoor segment of the welfare distribution.

Likewise, our Tobit-based estimation of the poverty gap indicated that parameters measuring the impact of household characteristics on welfare are often not the same for the poor and nonpoor. Many human and physical capital assets had higher returns for the poor. Locational disadvantages were also often larger for the poor than the population at large. Our results call for caution when relying on one single multivariate model to study the correlates of poverty. We would argue that the three models used here (OLS Welfare Model, Probit Poverty Model, and Tobit Poverty Gap Model) constitute a useful minimal set to investigate the determinants of poverty.

Using the criterion of two-thirds of household expenditure per equivalent adult (OECD equivalence scale), poverty in Eastern Europe was found to be significantly lower than in FSU countries. Hungary and Poland have the lowest poverty incidence (21-23 percent) and a poverty gap less than 15 percent of the poverty line. Bulgaria is slightly worse-off with a poverty rate of 26 percent and a poverty gap of 20 percent. Each of the FSU countries exceeds those statistics by far. Estonia has a poverty incidence of 30 percent and a poverty gap of 20 percent. In Russia and Kyrgyz Republic, the poverty rate is around 40 percent and the poverty gap is in the 25-30 percent range.

The profile of poverty shows some common aspects for Eastern Europe and the Former Soviet Union as well as pronounced differences:

⇒ rural poverty is higher than urban poverty; within urban areas, the capital city has the lowest poverty (except in Hungary); however, in the East European capitals, the poverty gap was higher than elsewhere in the country.

⇒ in Eastern Europe, there is a very strong correlation between poverty incidence and the number of children in the household; in the FSU this is less pronounced, except in Russia;

⇒ single person household, especially elderly females, have very high poverty rates (except in Poland); their poverty is also more severe;

⇒ consistent with this, pensioner households have above average poverty incidence and gap (except in Poland);

⇒ however, the highest poverty rates are found among people who have lost an active or regular connection with the labor market and live on social transfers (other than pensions) or other non-earned income as prime source of revenue; their poverty rates can be as much as three times higher than the national average, especially if two or more household members are unemployed; these households often absorbed the highest social cost of transition by failing to obtain a regular source of earnings;

⇒ the poverty gap is remarkably uniform in East European countries, especially in Poland and Hungary, indicating that social safety nets have prevented the emergence of deep pockets of poverty. In the FSU, this is much less the case, and frequently those with the highest poverty rate also have the highest poverty gap;

⇒ the key role of labor market connections should not lead to the conclusion that there is no poverty among the working class. Many have low education (primary education or less) or outdated vocational/technical education, and while poverty rates are low for workers, their sheer mass in the total population means that the working poor constitute the largest group of poor.

⇒ the connection between education and poverty suggests that only those with special skills or university education succeed in escaping poverty in great numbers, thanks to demand for their skills from the newly emerging private sector.

⇒ Last, the profile shows that there is a gender dimension to poverty in each country. Female-headed households have higher poverty incidence and gap in each of the six countries.

Without wishing to downplay differences across countries, the common aspects in this profile of poverty suggests that there is a case to be made for a poverty alleviation policy for the East Europe/FSU region as a whole. Lessons learned in one country are likely to have applicability in others. Priorities in targeting (children, elderly, low-educated workers, female-headed households) are similar across countries and the design of targeted interventions can benefit from region-wide experiences. Needless to say, social and cultural differences are important, and must be given their due weight, even if economic behavior and responses are similar.

The multivariate analysis has corroborated the univariate observations from the poverty profile, and made it possible to compare net effects, controlling for all other factors, and identify the highest pay-off actions. Although there is more variation across countries, some common factors have emerged:

⇒ education plays a key role for welfare improvements. There is always a significant welfare penalty to having achieved only primary education, and in some countries (those most advanced in the transition process) the penalty extends to vocational and technical education as well. Since it is not practical to quickly upgrade education and/or retrain huge segments of the population, this aspect of poverty will remain a long-term challenge.

⇒ ownership of a household enterprise has very high payoffs in several countries, often increasing household welfare by 20-30 percent. Returns are even higher for the poor. Unquestionably, programs of information, micro-credit, marketing, small business incubators, etc. to help entrepreneurs and prospective entrepreneurs must take center stage in poverty alleviation in Eastern Europe and FSU. There is every reason to believe that in the short- to medium-term, employment creation will be much higher in the informal sector than in the formal (often still-to-be privatized) sector.

⇒ age and gender effects are of concern in some countries (Bulgaria, Kyrgyz Republic) but not in others like Poland where the pension system has adequate reach. This is primarily an issue of re-targeting pensions and other social transfers, or of increasing the level of the minimum pension (paid primarily to women who lack adequate work-tenure to receive higher old-age pensions), at the expense of compressing the rest of the pension distribution.

The multivariate analysis has confirmed the importance of household composition, especially the number of children: households do not succeed in maintaining their welfare levels when the number of children increases. This calls for child-oriented transfer programs to move away from general entitlements to means-tested or proxy means-tested programs.

In the final section of this paper, we undertook an assessment of the potential of proxy means-testing and indicator-targeting for poverty alleviation programs such as social assistance. We used a set of easily identifiable household characteristics, including

demographic composition, education, employment status, location, household durables and official income to estimate a forward stepwise regression to identify the best predictors. The results for Eastern Europe were more promising than for FSU. In a first run, we could successfully identify more than 90 percent of nonpoor households, using a set of 25-30 indicators. A surprising but potentially very important result was that this accuracy was only marginally reduced when the best 5 or 10 predictors were used. In a second run, limited to the lowest half of the distribution (assuming that the first run had successfully identified households in the top half), we correctly identified 60-87 percent of the poor. Again, the loss in accuracy was small when using only the best 5 or 10 predictors. These are very respectable results and suggest that such an approach is worth considering for real-life application.

In the FSU countries, the first-stage correct identification of non-poor households achieved only 69-77 percent, and in the second stage the poor were correctly predicted 65-83 percent of the time. These results are still far better than the systems currently in place in the FSU countries. In Russia, experiments are currently being undertaken with indicator-targeting to see how alternative formulas and sets of indicators can improve correct identification of needy social assistance recipients.

References

Ackland, R., J. Braithwaite, M. Foley, T. Garner, C. Grootaert, B. Milanovic, G-T. Oh, S. Sipos, S. Tsirounian, Y. Ying (1997). "Household Expenditure and Income Data for Transition Economies (HEIDE)" mimeo, Policy Research Group, Washington, DC: World Bank.

Alderman, H. and M. Garcia (1993). "Poverty, Household Food Security, and Nutrition in Rural Pakistan". *International Food Policy Research Institute Research Report No. 96*. Washington, DC: International Food Policy Research Institute.

Appleton, S. (1995). "The Rich are Just Like Us, Only Richer — Poverty Functions or Consumption Functions?" *Centre for the Study of African Economies Working Paper No. 95-4*. University of Oxford

_____. (1996). "Women-headed Households and Household Welfare: An Empirical Deconstruction for Uganda". *World Development*. Vol. 24. No. 12. pp. 1811-1827

Atkinson, A. and J. Micklewright (1992). *Economic Transformation in Eastern Europe and the Distribution of Income*. Cambridge, UK: Cambridge University Press.

Bardhan, P. K. (1984). *Land, Labor and Rural Poverty*. Delhi: Oxford University Press.

Braithwaite, J. (1990). "Income Distribution and Poverty in the Soviet Republics." *Journal of Soviet Nationalities*. Vol. 1. No. 3.

_____. (1991). "The Social Safety Net in the Sovereign Republics." Conference paper presented at the American Association for the Advancement of Slavic Studies National Convention, November 1991.

_____. (1995). *The Old and New Poor in Russia: Trends in Poverty*. Background paper for Russian Poverty Assessment. Education & Social Policy Department Working Paper. Washington, DC: World Bank.

Chase, R. (1995). *Women's Labor Force Participation During and After Communism: A Case Study of the Czech Republic and Slovakia*. Economic Growth Center Discussion Paper No. 768. New Haven: Yale University.

Commander, S., A. Tolskopietenko, and R. Yemslov (1997). "Channels of Redistribution: Inequality and Poverty in the Russian Transition." Paper presented at the European Bank for Reconstruction and Development "Inequality and Poverty in Transition Economies" Conference, May.

Davidson, R. and J. Mackinnon. (1981). "Several Tests for Model Specification in the Presence of Multiple Alternatives". *Econometrica*. Vol. 49. pp. 781-793

Diamond, C. A., C. J. Simon and J. T. Warner. (1990). "A Multinomial Probability Model of Size Income Distribution". *Journal of Econometrics*. 43

Einhorn, B. (1993). *Cinderella Goes to Market: Citizenship, Gender and Women's Movements in East Central Europe*. London: Verso.

Fong, M. (1996). "Gender Barriers in the Transition to a Market Economy". *Poverty and Social Policy Department Discussion Paper No. 87*. Washington, DC: World Bank.

Foster, J., J. Greer and E. Thorbecke (1994). "A Class of Decomposable Poverty Measures." *Econometrica*. Vol. 52. pp. 571-576.

Funk, N. and M. Mueller (1993). *Gender Politics and Post-Communism: Reflections from Eastern Europe and the Former Soviet Union*. New York: Routledge.

Gaiha, R. (1988). "On Measuring the Risk of Poverty in Rural India". Chapter 7 in T. N. Srinivasan and P. Bardhan (eds.), *Rural Poverty in South Asia*. New York: Columbia University Press.

Glewwe, P. (1991). "Investigating the Determinants of Household Welfare in the Côte d'Ivoire". *Journal of Development Economics*, Vol. 35.

Glewwe P. and G. Hall. (1995). "Who is Most Vulnerable to Macroeconomic Shocks? Hypotheses Tests using Panel Data from Peru". *Living Standards Measurement Study Working Paper No. 117*. Washington DC: World Bank.

Gregory, P. and R. Stuart (1990). *Soviet Economic Structure and Performance. Fourth Edition*. New York: Harper & Row.

Grootaert, C. (1995). "Poverty and Social Transfers in Poland". *Policy Research Working Paper No. 1440*. Washington, DC: World Bank.

_____. (1997a). "Poverty and Social Transfers in Hungary". *Policy Research Working Paper No. 1770*. Washington, DC: World Bank.

_____. (1997b). "The Determinants of Poverty in Côte d'Ivoire in the 1980s". *Journal of African Economies*. 6(2) pp. 169-196

Grosh, M. and J. Baker (1995). Proxy Means Tests for Targeting Social Programs-Simulation and Speculation. *Living Standards Measurement Study Working Paper No. 118*. Washington, D. C.: World Bank.

Harris, J. and M. Todaro (1970). "Migration, Unemployment, and Development: A Two-Sector Analysis." *American Economic Review*. Vol. 60. pp. 126-142.

Kaufmann, D. and A. Kaliberda (1996). "Integrating the Unofficial Economy into the Dynamics of Post-Socialist Economies: A Framework of Analysis and Evidence." In Kaminski, B. (Ed.) *Economic Transition in Russia and the New States of Eurasia*. Armonk, NY: Sharpe. pp. 81-122.

Klugman and Braithwaite (1998). "Poverty in Russia During the Transition: An Overview." *World Bank Research Observer*. Forthcoming, February.

Klugman (1997). (Ed.) *Poverty in Russia: Public Policy and Private Responses*. Washington, DC: Economic Development Institute, The World Bank.

Koen, V. and E. Gavrilenko (1994). "How Large Was the Output Collapse in Russia?: Alternative Estimates and Welfare Implications." *International Monetary Fund Working Paper*. WP/94/6. Washington, DC: International Monetary Fund.

Koen, V. (1996). "Russian Macroeconomic Data: Existence, Access, Interpretation." *Communist Economies and Economic Transformation*. Vol. 8. pp. 321-333.

Kolev, A. (1996). "Poverty Analysis in Russia: What Can We Learn from the RLMS Round 6?" Florence, Italy: European University Institute.

Krumm, K., B. Milanovic and M. Walton (1994). "Transfers and the Transition from Socialism: The Key Tradeoffs." *Policy Research Working Papers Series*. No. 1380. Washington, DC: World Bank.

Lanjouw, P. and N. Stern. (1991). "Poverty in Palanpur". *World Bank Economic Review*. 5(1).

Maddala, (1983). *Limited-Dependent and Qualitative Variables in Econometrics*. Cambridge: Cambridge University Press.

Milanovic, B. (1990). "Poverty in Poland, Hungary, and Yugoslavia in the Years of Crisis 1978-87". *Policy Research Working Paper No. 507*. Washington, DC: World Bank.

_____. (1995). "Poverty, Inequality and Social Policy in Transition Economies". *Transition Economies Research Paper Series No. 9*. Washington, DC: World Bank.

_____. (1997). "Explaining the Growth in Inequality during the Transition". Mimeo. Policy Research Department. Washington, DC: World Bank.

_____. (Forthcoming). *Income, Inequality, and Poverty During the Transition*.

Perraudin, W. and T. Pujol. (1994). "Framework for the Analysis of Pension and Unemployment Benefits Reform in Poland". *International Monetary Fund Staff Papers*. 41(4), pp. 643-674

Ravallion, M. (1993). "Poverty Comparisons: A Guide to Concepts and Methods." *Living Standards Measurement Study Working Paper*. No. 88. Washington, DC: World Bank.

_____ . (1996). " Issues in Measuring and Modeling Poverty". *The Economic Journal*. 106, pp. 1328-1343.

Revesz, T. (1994). *An Analysis of the Representativity of the Hungarian Household Budget Survey Samples*. Mimeo. Department of Applied Economics. University of Cambridge, United Kingdom.

Subbarao, K. *et al. Safety Net Programs and Poverty Reduction: Lessons from Cross-Country Experience*. Washington, DC: World Bank.

World Bank. (1993). *Poland: Income Support and the Social Safety Net During the Transition.* Washington, DC.: World Bank.

_____. (1994a). *Averting the Old-Age Crisis*. Washington, DC.: World Bank.

_____. (1994b). *Poland: Poverty In Poland.* Report No. 13051-POL. Washington, DC: World Bank.

_____. (1995a). *Kyrgyz Republic: Poverty Assessment and Strategy.* Report No. 14380-KG. Washington, DC: World Bank.

_____. (1995b). *Russia: Poverty in Russia: An Assessment.* Report No. 14110-RU. Washington, DC: World Bank.

_____. (1995c). *Ukraine: Poverty in Ukraine.* Report No. 15602-UA. Washington, DC: World Bank.

_____. (1995d). *Understanding Poverty in Poland.* Washington, DC: World Bank.

_____. (1996a). *Armenia: Confronting Poverty Issues*. Report No. 15693-AM. Washington, DC.: World Bank.

_____. (1996b). *Belarus: An Assessment of Poverty and Prospects for Improved Living Standards*. Report No. 15380-BY. Washington, DC: World Bank.

_____. (1996c). *Estonia: Living Standards During the Transition.* Report No. 15637-EE. Washington, DC.: World Bank.

_____. (1996d). *Hungary: Poverty and Social Transfers.* Report No. 14658-HU. Washington, DC: World Bank.

_____. (1996e). *World Development Report 1996: From Plan to Market.* Washington, DC: World Bank.

Statistical Annexes

Annex 1: Means and Standard Deviations of Variables (East European Countries)

	Bulgaria		*Hungary*		*Poland*	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*
Household size	2.92	1.56	2.78	1.33	3.13	1.61
Number of children	0.47	0.80	0.58	0.90	0.75	1.06
Number of male adults	0.98	0.84	0.90	0.74	1.00	0.78
Number of female adults	1.02	0.79	0.97	0.67	1.09	0.69
Number of elderly	0.45	0.66	0.33	0.59	0.28	0.56
Age of head of household	55.04	15.31	49.2	16.3	48.7	14.8
Age of head squared	3264.2	1694.4	2682.1	1703.9	2594.3	1537.5
Female head of household	0.21	0.41	0.31	0.46	0.35	0.48
Head with primary education	0.47	0.50	0.43	0.49	0.33	0.47
Head with secondary education	0.31	0.46	0.22	0.41	0.26	0.44
Head with vocational/technical education	0.07	0.26	0.24	0.43	0.32	0.46
Head with university education	0.15	0.35	0.11	0.32	0.10	0.30
Tenancy status: renter	0.07	0.26	0.17	0.38	0.45	0.50
Household enterprise ownership	0.05	0.21	0.08	0.27	0.06	0.23
Land ownership	0.40	0.49	—	—	0.50	0.50
Share of wages in total household income	0.29	0.32	0.40	0.36	0.38	0.39
Number of unemployed household members	—	—	0.21	0.49	0.16	0.42
Unemployed head of household	—	—	0.05	0.22	0.02	0.15
Inactive head of household	—	—	0.36	0.48	0.35	0.48
Capital city	0.15	0.36	0.22	0.41	0.07	0.26
Other city	0.52	0.50	0.41	0.49	0.60	0.49
Rural areas	0.33	0.47	0.37	0.48	0.33	0.47

Annex 2: Means and Standard Deviations of Variables (FSU Countries)

	Estonia		*Russia*		*Kyrgyz*	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*
Household size	2.41	1.34	2.75	1.39	4.93	2.76
Number of children	0.51	0.85	0.59	0.86	1.82	1.70
Number of male adults	0.70	0.68	0.82	0.72	1.39	1.07
Number of female adults	0.88	0.65	0.98	0.68	1.48	1.01
Number of elderly	0.32	0.58	0.35	0.60	0.24	0.50
Age of head of household	48.10	16.41	48.4	15.75	41.16	14.00
Age of head squared	2582.5	1656.8	2590.7	1620.4	1889.6	1304.5
Female head of household	0.36	0.48	0.29	0.46	0.18	0.38
Head with primary education	0.28	0.45	0.28	0.45	0.33	0.47
Head with secondary education 1/	0.58	0.49	0.34	0.47	0.24	0.43
Head with vocational/technical education 1/	...	...	0.16	0.37	0.25	0.43
Head with university education	0.13	0.34	0.25	0.43	0.18	0.38
Tenancy status: renter	0.50	0.50	0.55	0.50	0.08	0.27
Household enterprise ownership	0.22	0.41	0.08	0.28	0.32	0.47
Land ownership	0.53	0.50	0.23	0.42	0.58	0.49
Share of wages in total household income	0.45	0.39	0.43	0.39	0.27	0.33
Number of unemployed household members	0.11	0.37	0.08	0.30	...	...
Unemployed head of household	...	...	...	...	0.08	0.27
Inactive head of household	0.32	0.47	0.34	0.47	0.22	0.42
Capital city	0.47	0.50	0.61	0.49	0.26	0.44
Other city	0.26	0.44	0.28	0.45	0.59	0.49
Rural areas	0.27	0.44	0.10	0.31	0.17	0.37

Notes:

1/ It was not possible to separate household heads with vocational-technical education from heads with general secondary education in Estonia, due to lack of comparability between definitions used in the Estonian survey and those used in other countries.

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